

Appendix A EDMS TUTORIAL

A.1 INTRODUCTION

The purpose of this tutorial is to demonstrate the application of the Emissions and Dispersion Modeling System (EDMS). These sample scenarios are fictional and are used only to show the working of the model. Each “hands on” example problem has been included to demonstrate the many features of the EDMS model. After running the example problems, the user can check his or her results against the sample cases distributed with the EDMS software.

This document assumes a working knowledge of the Microsoft® Windows™ environment. Please refer to your Microsoft® Windows™ documentation for further guidance.

A.2 A SIMPLE EMISSIONS INVENTORY

A.2.1 Project Description

This example demonstrates the steps necessary to compute an airport emissions and dispersion inventory. For our example, we are going to look at a HAGERSTOWN REGIONAL-RICHARD A HENSON FIELD, HGR. The following tables contain all of the data necessary for the combined emissions and dispersion example. Users who are only interested in performing an emissions inventory using user-specified taxi times should ignore the data outlined in orange. **This example uses fictitious data; the results should not be used for any regulatory purposes.**

Table A-1-1: Gates
(Sequence modeling)

Gate	Point	x-coordinate	y-coordinate
FBO	1	603.67	721.78
	2	940.81	806.12
	3	918.53	1073.32
	4	1026.43	1087.88
	5	1003.01	1291.43
	6	734.13	1513.90
	7	586.88	1290.09
Main	1	-1263.12	-1053.15
	2	-716.17	-1186.54
	3	-636.83	-885.50
	4	-1187.66	-779.26

**Table A-1-2: Taxiways
(Sequence Modeling)**

Taxiway Name - Point	x-coordinate	y-coordinate	Elevation	Speed
A - 1	1682.23	289.86	702	17.26
A - 2	1610.27	791.08	703	17.26
A - 3	147.93	546.21	699	17.26
A - 4	-475.53	345.02	695	17.26
A - 5	-3525.21	-149.66	664	17.26
A - 6	-3557.15	-604.85	659	
B - 1	882.90	778.09	703	17.26
B - 2	849.74	633.20	702	17.26
B - 3	898.88	169.77	699	
C - 1	382.65	1480.49	704	17.26
C - 2	-75.46	1299.21	702	17.26
C - 3	-817.62	-1427.63	687	17.26
C - 4	-771.00	-1669.95	687	17.26
C - 5	-531.41	-1742.66	689	17.26
C - 6	-393.70	-1519.03	690	
D - 1	-1053.15	223.10	682	17.26
D - 2	-979.62	-133.69	683	17.26
D - 3	-1148.75	-794.21	685	
E - 1	-2673.88	-472.44	670	17.26
E - 2	-2610.57	-763.14	671	
F - 1	-3615.49	-610.24	659	17.26
F - 2	-3559.71	-918.64	661	17.26
F - 3	-97.92	-393.38	694	
W - 1	377.45	1412.34	703	17.26
W - 2	613.68	1288.76	703	

Table A-1-3: Runways (Sequence Modeling)

Runway	X	Y	Elevation	Glide Slope
2	-393.37	-1519.03	690	3
20	382.65	1480.49	704	3
9	-3615.49	-610.24	659	3
27	1682.23	289.86	702	3

Table A-1-4: Buildings (Dispersion)

Building	Height(ft)	Point	x-coordinate	y-coordinate
Top Flight Airpark	46	1	-85.30	-1896.33
		2	692.61	--2083.34
		3	909.15	-1271.64
		4	538.06	-1166.65
		5	571.99	-924.14
		6	344.49	-875.19
		7	360.89	-622.83
		8	255.91	-587.01
Hangars	32.81	1	-835.02	1167.98
		2	-403.47	1000.66
		3	-85.22	1613.56
		4	-669.29	1810.41

A.2.2 Procedures

Start EDMS by selecting EDMS from the Programs group in the start menu. If you are unfamiliar with the use of the mouse, icons, menus, or program groups, please refer to your Windows™ documentation.

A.2.3 Setting up the study

We will begin the tutorial by creating a new study, and entering basic descriptive information.

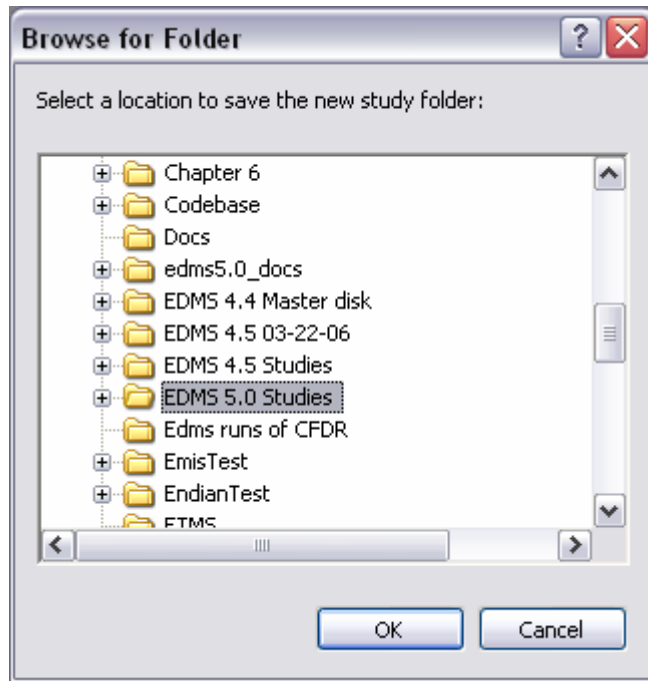
Action

When you first start EDMS, a message box will pop up with some information about the First-Order Approximation for estimating PM emissions from commercial jet-turbine aircraft engines. Click the OK button to close the message box.

Next click on File on the menu bar in the upper left corner of the main EDMS window, and select New from the drop down menu.

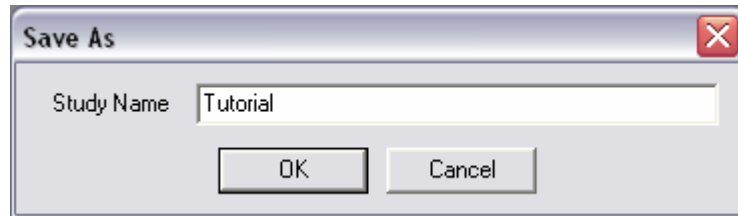
Result

This brings up the Browse for Folder dialog. Here you can select where EDMS will create the directory to hold your data files.



1. Select the directory where you wish to create your new study with its own subdirectory, then Press OK.

As with any Windows™ file selection box, you can choose where you wish to save your files.



2. Type “Tutorial” in the Study Name box, and then press OK.

This action creates a directory called Tutorial at the selected location. All information relevant to the study will be saved under this directory. It also opens the Airport Properties dialog, because every study must have at least one airport defined.

Airport Properties

Identification

Name: Hagerstown Regional-Richard A Henson Fld

IATA Code: HGR ICAO Code: KHGR FAA Code:

Country Code: US

ID selection and name editing is only available when an airport is first created.

Description

Description: Hagerstown Regional-Richard A Henson Fld

ICAO Region: K Region for Aircraft Default Engine: US

Country: United States of America

State: Maryland

City: Hagerstown

Origin Coordinates

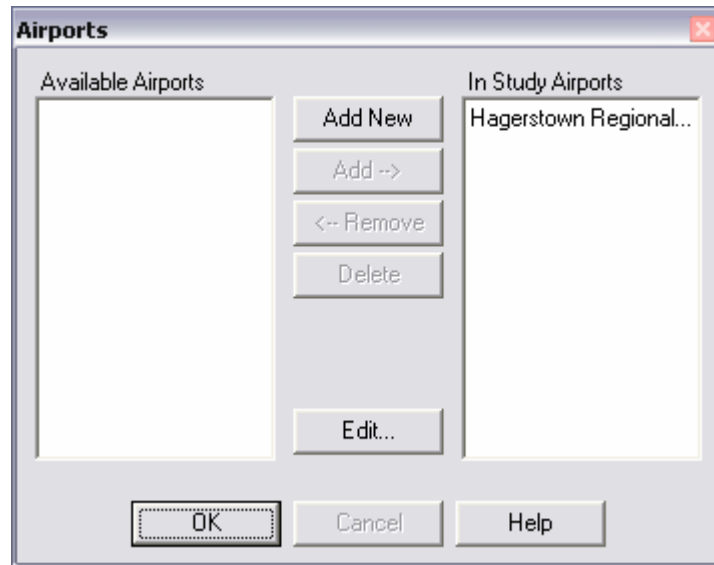
☒ Latitude & Longitude ☐ UTM's

Latitude: 39.707944 N Longitude: 77.7295 W Elevation: 703 (ft)

Northing: 4398905 Easting: 266004.69 UTM Zone: 18

OK Cancel Apply Help

3. Type or select "HGR" in the IATA Code drop down list box. This will be a fictitious sample of Hagerstown Regional-Richard A. Henson field in Maryland. This loads the default information for the selected airport.
4. Select US in the Region for Aircraft Default Engine. This sets the default engine type for the airframe on the Aircraft Operations & Assignments dialog.
5. Press OK to remember the selected airport. This closes the Airport Properties dialog and indicates the intention to save the airport, but the airport is not yet added to the study. It also opens the Airports dialog.



6. Press OK to remember the airport.

This closes the Airports dialog and indicates our intention to save the airport. It also opens the Study Properties dialog. If we intended to have more than one airport, we would press the Add New button now, and would return to the Airport Properties dialog. Our airport still has not been saved, but remains in memory.

Study Properties

Study Name: Tutorial

Study Description: Add a description.

☐ Enable Dispersion Modeling

Unit System: ☒ Metric (e.g. meters) ☐ English (e.g. feet)

Default Emissions Inventory Units: ☒ Metric Tons ☐ Kilograms ☐ Grams ☒ Short Tons (2000 lbs) ☐ Pounds (Avoirdupois)

Analysis Years: First Year: 2007 Last Year: 2007 No. of Years: 1

No. of Scenarios in study: 1 No. of Airports in study: 1

Edit Scenario List... Edit Airport List... OK Cancel Apply Help

7. The Study Properties dialog comes up in the state shown above. The default year is the current calendar year. Select English in the Unit System box.

8. Select Pounds for the units.

9. Set the Last Year to 2004.

10. Enter "Sample Emissions & Dispersion Study" into the Study Description field.

11. Press Edit Scenario List.

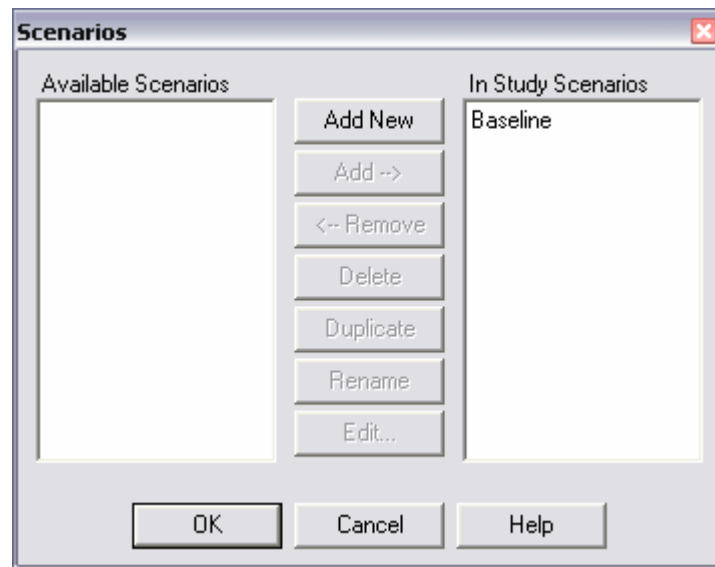
The selected unit system will be used for all dialogs and reports, except for Stationary Sources, where the units depend on the source. Also, when viewing emissions we can override the units being used for the display.

The default units for displaying the emissions inventory results will be pounds.

This will also force the First Year to be 2004, since the First Year is always less than or equal to the Last Year, and will change the year in the text box to be 2004 as well. Alternatively, we could have edited the 2007 in the text box to be 2004 with the same result.

This field will be remembered here and will appear on some reports.

This opens the Scenarios dialog.



12. Select the scenario Baseline in the In Study Scenarios list.

Baseline is the name of the default scenario created when a new study is created. Selecting a scenario in the In Study Scenarios list activates the Duplicate, Rename and Edit buttons. If there is more than one scenario in the list it also activates the Remove button.

13. Press Edit.

This opens the Scenario Properties dialog for the scenario Baseline.

Scenario Properties

Name:

Description:

System Aircraft Times in Mode Basis (for Emissions Inventories)

☒ Performance Based (SAE AIR 1845)

☐ ICAO/USEPA Defaults

Taxi Time Modeling Options

☒ User-specified taxi times for each aircraft

☐ Sequence Modeling

FOA 3.0 Sulfur-to-Sulfate Conversion Rate

%

OK Cancel Apply Help

14. Select ICAO/USEPA Defaults in the System Aircraft Times in Mode Basis box.

EDMS will read the times in mode from a table, rather than compute them dynamically.

15. Press the OK button.

Remember the change in Scenario options and close the Scenario Properties dialog.

16. Press the OK button on the Scenarios dialog.

Remember any changes to Scenarios and close the Scenarios dialog.

17. Press the OK button on the Study Properties dialog.

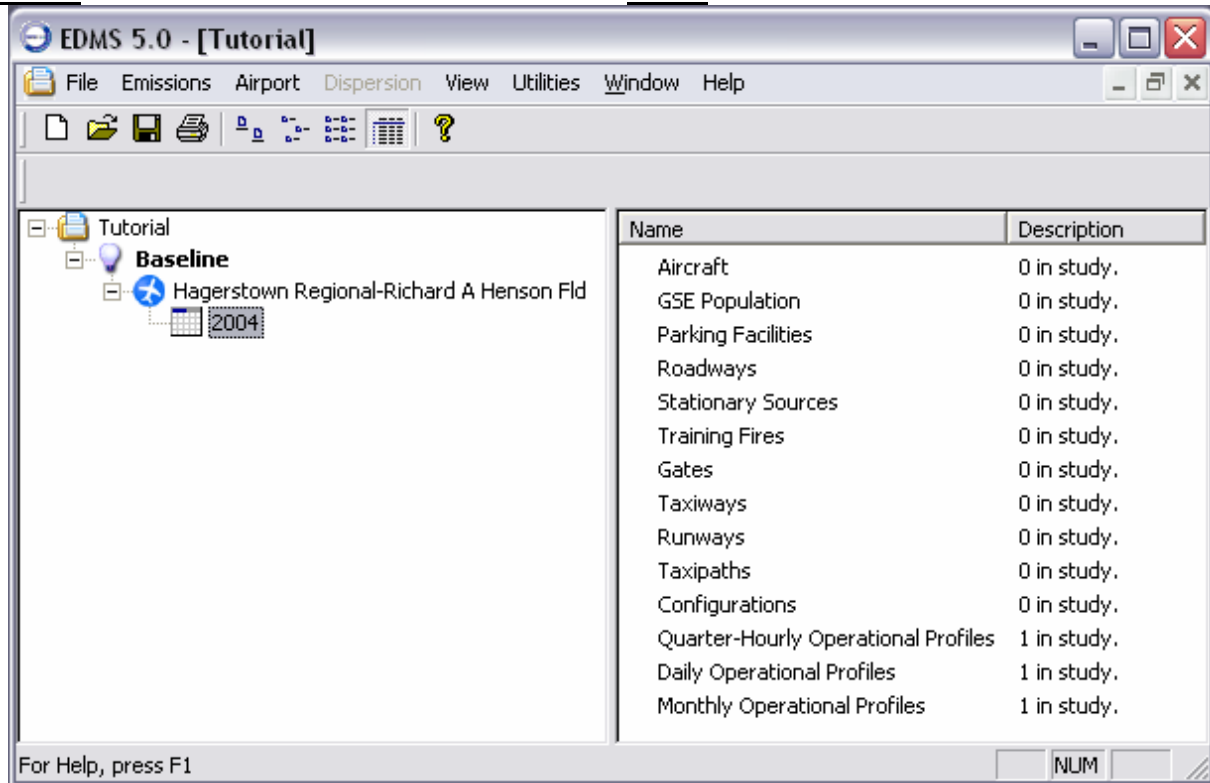
Closes the Study Properties dialog and finally applies all the changes made to airports and scenarios.

A.2.4 Adding Aircraft

For each of our sources, we must first provide EDMS with information to compute the emissions inventory. We begin by matching engines with aircraft and assigning them to the study.

Action

Result



1. Select the year 2004 in the study tree in the left pane of the main study window.
2. Select *Aircraft* from the *Emissions* menu.

EDMS knows to associate any data now entered to the Baseline scenario, Hagerstown Airport and year 2004 in whatever combination is appropriate to the data.

This brings up the *Aircraft Operations & Assignments* window with the Operations tab activated, which allows you to specify information about the aircraft included in the study, their associated activity rates, and their associated ground support equipment.

Action

Result

Aircraft Operations & Assignments - [Tutorial] - Baseline - Hagerstown

Available Aircraft/Engines

- Boeing 737-300 Series
 - CFM56-3
 - CFM56-3B
 - CFM56-3-B1**
 - CFM56-3B-2
 - CFM56-3B-4
 - CFM56-3C-1
 - CFM56-3C-1 (Rerate)

Aircraft/Engine Combinations In Study

Aircraft Type	Engine Type	Identification	Category
Boeing 737-30...	CFM56-3-B1	Airline	LCJP

Operations | Schedule | Performance | APU Assignment | GSE & Gate Assignment | Engine Emissions

☐ Use Schedule ☐ Enter LTOs ☒ Enter Departures & Arrivals Separately

	LTOs	Departures	Arrivals	Touch & Gos
<input checked="" type="radio"/> Annual Total		1000	1000	0
<input type="radio"/> Peak Quarter-Hour		0.028461	0.028461	0

Quarter-Hourly Profile: [] [] [] []
Daily Profile: [] [] [] []
Monthly Profile: [] [] [] []

OK Cancel Apply Help

- For each aircraft-engine combination to be added to the study, click on the + to the left of the aircraft to reveal the list of engines, then double-click on the engine (or select the engine and press the *Add* button) to add it. Provide identification by double-clicking the *Identification* field (or right-clicking and selecting *Rename*) and then typing the desired text.
- After adding each aircraft, enter the number of yearly operations shown (*Departures*, *Arrivals*, and *Touch & Gos*) in the figure above.

Since EDMS allows you to enter the same aircraft-engine combination more than once in a study, it is important to provide descriptive identifications.

We will be using the aircraft-engine pair shown on the screen above for the tutorial. There are often multiple engines available for each aircraft type. For this tutorial it is important to use the engines shown.

If the departure and arrival data for the aircraft are the same, we can select *Enter LTOs* and enter that operational information for the aircraft once. If after applying and closing the *Aircraft Operations and Assignments* dialog, we subsequently return to the dialog, we will see that the selection has returned to *Enter Departures & Arrivals Separately*.

Action

5. We are not using a schedule file, so we can skip the *Schedule* tab. We will use the defaults on the all the other tabs, so we can skip those as well.
6. Press OK apply all the aircraft data.

Result

Aircraft operations and assignments are complete.

The Aircraft Operations & Assignments dialog will close.

A.2.5 GSE Population

We are going to add some GSE that are not assigned to aircraft to our airport.

Action

1. Select *GSE Population* from the *Emissions* menu.
2. Click the + to the left of Air Conditioner (ACE 804).
3. Select Diesel as the Air Conditioner's fuel.
4. Press *Add*..
5. Press Enter to accept the default identification.
6. Change the Population to 5, and the Yearly Operating Time to 500 hours.
7. Click the + to the left of Belt Loader.
8. Select Gasoline as the Belt Loader's fuel.
9. Press *Add*..
10. Press Enter to accept the default identification.
11. Change the Population to 3, and the Yearly Operating Time to 1000 hours.
12. Press *OK*. See the figure below for completed window.

Result

This brings up the *GSE Population* dialog where you can add GSE that are not assigned to specific aircraft types.

This will expand the Air Conditioner to show its fuel options.

This selection activates the *Add* button.

The Diesel air conditioner is provisionally (the user can *Cancel*) added to the study. Its Identification field is ready to edit.

This leaves the air conditioner selected.

This sets the air conditioner's operational usage.

This will expand the Belt Loader to show its fuel options.

This selection activates the *Add* button.

The gasoline belt loader is provisionally added to the study. Its Identification field is ready to edit.

This leaves the belt loader selected.

This sets the belt loader's operational usage.

The changes are all applied and the GSE Population dialog closes.

GSE Population - [Tutorial] - Baseline - Hagerstown

Available

- + *** Belt Loader
- + *** Cabin Service Truck
- + *** Cargo Tractor
- + *** My Gse
- + Air Conditioner (ACE 802)
- + Air Conditioner (ACE 804)
- + Air Conditioner (Generic)
- + Air Start (ACE 180)
- + Air Start (ACE 300/400)

Add -->

--> Remove

Duplicate

Rename

In Study

Type	Fuel	Ref. Model	Identification
Air Conditioner	Diesel	ACE 804	#1
Belt Loader	Gasoline	Stewart & Stev...	#1

Population (units)

Operating Time

☒ Yearly (hours)

☐ Per Qtr Hour (min/hr)

Operational Profiles

Qtr-Hourly

Daily

Monthly

Emission Parameters

Rated Power hp

Load Factor %

☒ Use default age distribution

☐ Specify a specific age

Analysis Year

Year of Manufacture

Age (years)

OK

Cancel

Apply

Help

Table A-1-5: Parking Facilities Activity (Dispersion)

Parking Facility	Point	x-coordinate	y-coordinate
Parking Garage	1	-1932.42	-3795.94
	2	-432.42	-3795.94
	3	-432.42	-2795.94
	4	-1932.42	-2795.94

A.2.6 Parking Facilities

We are now going to include one parking facility in our tutorial with an annual traffic flow of 75,000 vehicles and an average speed of 10 mph.

<u>Action</u>	<u>Result</u>
1. Select <i>Parking Facilities</i> from the <i>Emissions</i> menu.	This brings up the <i>Parking Facilities</i> window where we will specify all of the information about our parking lot.
2. Press <i>Add New</i> and create a new parking facility. Change the name to “Terminal Parking”.	The default name for the new facility is Parking.
3. Set the <i>Yearly Number of Vehicles</i> to 75000.	This means that during the course of the entire year 75,000 vehicles will use the parking facility. The <i>Peak Qtr Hour</i> number of vehicles is automatically computed.
4. Set the <i>Speed</i> in the parking lot to 10 mph.	The speed of the traffic within the lot affects the emissions factors.
5. Leave the average <i>Idle Time</i> set to 1.5 minutes and set the average <i>Distance Traveled</i> in the lot to 325 feet.	The idle time and distance traveled also help determine the emissions.
6. Check the <i>Use System Generated Values</i> checkbox.	This tells EDMS that it should compute emission factors using MOBILE. Alternatively, we could have filled in emission factors manually.
7. Press <i>OK</i> . See the figure below for completed window.	Since we have Use System Generated Values checked, this triggers the MOBILE calculation. Once MOBILE finishes, this saves the parking lot information and closes the window.

Parking Facilities - [Tutorial] - Baseline - Hagerstown

Available

Add New
Add -->
<-- Remove
Delete
Duplicate
Rename

In Study

Terminal Parking

Number of Vehicles

☒ Yearly 75000
☐ Per Qtr Hour 2

Vehicle Emission Parameters

Default Fleet Mix (all types, fuels)

Fuel Diesel

Manufactured Year 2004

Speed 10 (mph)
Distance Traveled 325 (feet)
Idle Time 1.5 (mins)

Dispersion Parameters

Number of Levels 1
Release Height 4.92 (feet)
Level Spacing 9.84 (feet)
Elevation 702.99 (feet)

Number of Points 4

Poin...	X (feet)	Y (feet)
1	-1300.00	-1335.00
2	-1030.00	-1390.00
3	-1085.00	-1660.00
4	-1355.00	-1605.00

Nudge

Points should be entered in either a clockwise or counter-clockwise order.

Operational Profiles

Quarter-Hourly DEFAULT
Daily DEFAULT
Monthly DEFAULT

Preview

Emission Factors (grams/veh)

☒ Use System Generated Values

CO	5.593	THC	0.9465
NMHC	0.9105	VOC	0.9061
NOx	0.4024	SOx	0.0039
PM-10	0.0074	PM-2.5	0.0052

OK Cancel Apply Help

A.2.7 Roadways

We are now going to add an access road to the airport that will go around the parking lot and pass in front of the main terminal we will be adding later on.

<u>Action</u>	<u>Result</u>
1. Select <i>Roadways</i> from the <i>Emissions</i> menu.	This brings up <i>Roadways</i> dialog, which is very similar to the <i>Parking Facilities</i> dialog.
2. Click <i>Add New</i> button and add a new roadway called “Terminal Roadway”.	This will be our only road to and from the airport.
3. Set the Yearly number of vehicles to 75000, the Speed of vehicles on the roadway to 35.	These are required for computing an emissions inventory and as before the peak quarter hour value will be computed automatically.
4. Enter 0.41 miles for the <i>Roadway Length</i> .	This is needed for to compute the emission factors.
5. Check the <i>Use System Generated Values</i> checkbox.	This tells EDMS that it should compute emission factors using MOBILE. Alternatively, we could have filled in emission factors manually.
6. Press <i>OK</i> . See the figure below for completed window.	Since we have Use System Generated Values checked, this triggers the MOBILE calculation. Once MOBILE finishes, this saves the roadway information and closes the window.

Roadways - [Tutorial] - Baseline - Hagerstown

Available

In Study
Terminal Parkway

Traffic Volume
(Total flow regardless of direction.)
☒ Yearly 75000
☐ Peak Qtr- Hour 2

Operational Profiles
 Quarter-Hourly DEFAULT
 Daily DEFAULT
 Monthly DEFAULT

Emission Factors (grams/veh-mile)
☒ Use System Generated Values
 CO 20.297 THC 1.622
 NMHC 1.551 VOC 1.537
 NOx 2.041 SOx 0.032
 PM-10 0.059 PM-2.5 0.0416

Vehicle Emission Parameters
 Default Fleet Mix (all types, fuels)
 Fuel Diesel
 Manufactured Year 2004
 Average Speed 35 (mph)
 Roadway Length 0.41 (miles)

Coordinates (feet)
 Dispersion Width 65.62
 Number of Points 6

Pt.#	X (fe...)	Y (fe...)	Elev...
1	-1141....	-2211....	61
2	-976.00	-1401....	61
3	-1019....	-1346....	61
4	1200	1201	61

Nudge
 X Y

OK Cancel Apply Help

A.2.8 Stationary Sources

We are going to add a natural gas Emergency Generator for our airport. We are assuming that it has been in use for 96 hours in the year.

Action

13. Select *Stationary Sources* from the *Emissions* menu.
14. Click *Add New* button and add a new source called "Tower Generator" of category Emergency Generator.
15. Select Type: Diesel Fuel (EPA Methodology).
16. Enter the *Yearly Hours Operated* as 96 hours, and press *Apply*.
17. Press *OK*. See the figure below for completed window.

Result

This brings up the *Stationary Sources* dialog where you can add emissions information about stationary sources.

This will be our airport Emergency Generator.

The emission rates for this source type are expressed in grams/hp-hr and are displayed on the lower right.

Our generator will be added to the list.

The *Stationary Sources* dialog closes.

Stationary Sources - [Tutorial] - Baseline - Hagerstown

Available

--

Add New

Add -->

<-- Remove

Delete

Duplicate

Rename

In Study

Tower Generator

Category & Type

Emergency Generator

Diesel Fuel (EPA Methodology)

Hours Operated

Hours

Yearly 96

Peak 0

Operational Profiles

Qtr-Hourly DEFAULT

Daily DEFAULT

Monthly DEFAULT

Dispersion Parameters

Point Area Volume # of Points

	X (ft)	Y (ft)
1	0.00	0.00

Elevation (ft) Sigma-Z0 (ft)

Rel.Height (ft) Sigma-Y0 (ft)

Gas Velocity (m/s) Diameter (ft)

Temperature (°F) ☐ Temperature is degrees above ambient

Emission Parameters

☒ Use Default Values for Critical Emission Parameters

Parameter Name	Value	Units
CO EF	3.03	grams/hp-hr
TOC EF	1.14	grams/hp-hr
NOx EF	14.	grams/hp-hr
SOx EF	0.93	grams/hp-hr
PM-10 EF	0.998	grams/hp-hr
CO Pollution Contr...	0.	%
TOC Pollution Con...	0.	%
NOx Pollution Cont...	0.	%
SOx Pollution Cont...	0.	%
PM-10 Pollution C...	0.	%

OK

Cancel

Apply

Help

A.2.9 Training Fires

We are now going to add a training fire that burns 12,000 gallons of propane during the course of an entire year. .

Action

1. Select *Training Fires* from the Emissions menu.
2. Add a new training fire called “TF 1”, with a *Fuel* type of Propane, and *Yearly Gallons of Fuel Used* 12000.
3. Press *OK*. See the figure below for completed window.

Result

This brings up the Training Fires window.

We are specifying that a total of 12,000 gallons of fuel used will be used over the course of an entire year. As before, the peak quarter hour value will be computed automatically but this value will not be used for the emissions inventory.

The values are applied, and then the Training Fires dialog is closed.

Training Fires - [Tutorial] - Baseline - Hagerstown

Available

In Study

TF 1

Add New

Add -->

<-- Remove

Delete

Duplicate

Rename

Operational Profiles

Qtr-Hourly: DEFAULT

Daily: DEFAULT

Monthly: DEFAULT

Coordinates (feet)

X: 0

Y: 0

Elevation: 702.99

Gallons of Fuel Used

Yearly: 12000

Peak Qtr Hour: 0.34

Dispersion Parameters

Release Height: 13.12 (ft)

Diameter: 16.4 (ft)

Gas Velocity: 10 (m/s)

Temperature: 400 (°F)

Emission Factors (grams/gallon)

Fuel: Propane

Use System Default Values: [checked]

CO: 15.78

HC: 14.42

NOx: 2.9

SOx: 0.009

PM10: 53.16

OK Cancel Apply Help

A.2.10 Emissions Results

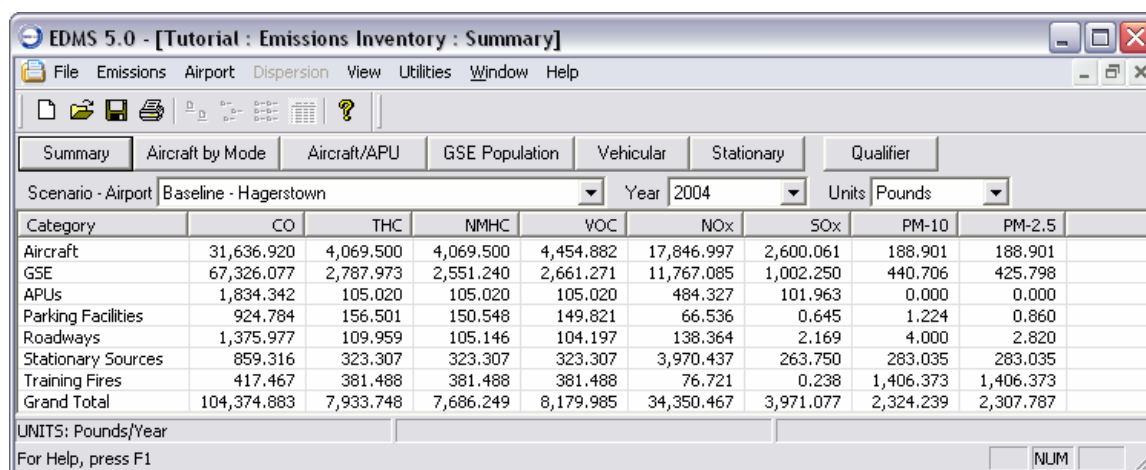
At this point all of the inputs necessary for the emissions inventory have been entered into the program. We are ready to run the emissions inventory for the scenario. You can compare the results you obtained against the scenario provided with the software.

Action

1. Select *Run Emissions Inventory* from the *Emissions* menu.

Result

This should run quickly, since our scenario is not very detailed. A window will appear when the emissions inventory is complete. The results will appear automatically and should be identical to those as shown below.



Category	CO	THC	NMHC	VOC	NOx	SOx	PM-10	PM-2.5
Aircraft	31,636.920	4,069.500	4,069.500	4,454.882	17,846.997	2,600.061	188.901	188.901
GSE	67,326.077	2,787.973	2,551.240	2,661.271	11,767.085	1,002.250	440.706	425.798
APUs	1,834.342	105.020	105.020	105.020	484.327	101.963	0.000	0.000
Parking Facilities	924.784	156.501	150.548	149.821	66.536	0.645	1.224	0.860
Roadways	1,375.977	109.959	105.146	104.197	138.364	2.169	4.000	2.820
Stationary Sources	859.316	323.307	323.307	323.307	3,970.437	263.750	283.035	283.035
Training Fires	417.467	381.488	381.488	381.488	76.721	0.238	1,406.373	1,406.373
Grand Total	104,374.883	7,933.748	7,686.249	8,179.985	34,350.467	3,971.077	2,324.239	2,307.787

UNITS: Pounds/Year
For Help, press F1

The values listed in this table should correspond to the values on your screen. If they do not, please check your inputs against those listed in the example.

A.3 A MORE DETAILED EMISSIONS INVENTORY

A.3.1 Changing Scenario Options

Action

1. Right-click on the scenario name "Baseline" in the study tree and select *Edit* on the popup menu.
2. Change the options to Performance Based and Sequence Modeling.
3. Press *OK*.

Result

This brings up the *Scenario Properties* dialog for the Baseline scenario.

This changes the way EDMS will compute aircraft performance and taxi times from lookups to dynamic calculations.

This applies the changes made to this dialog and closes it.

Action

4. Select the year 2004 in the study tree in the left pane of the main study window.

Result

We lost this selection when we opened the *Scenario Properties* dialog.

A.3.2 Operational Profiles

Action

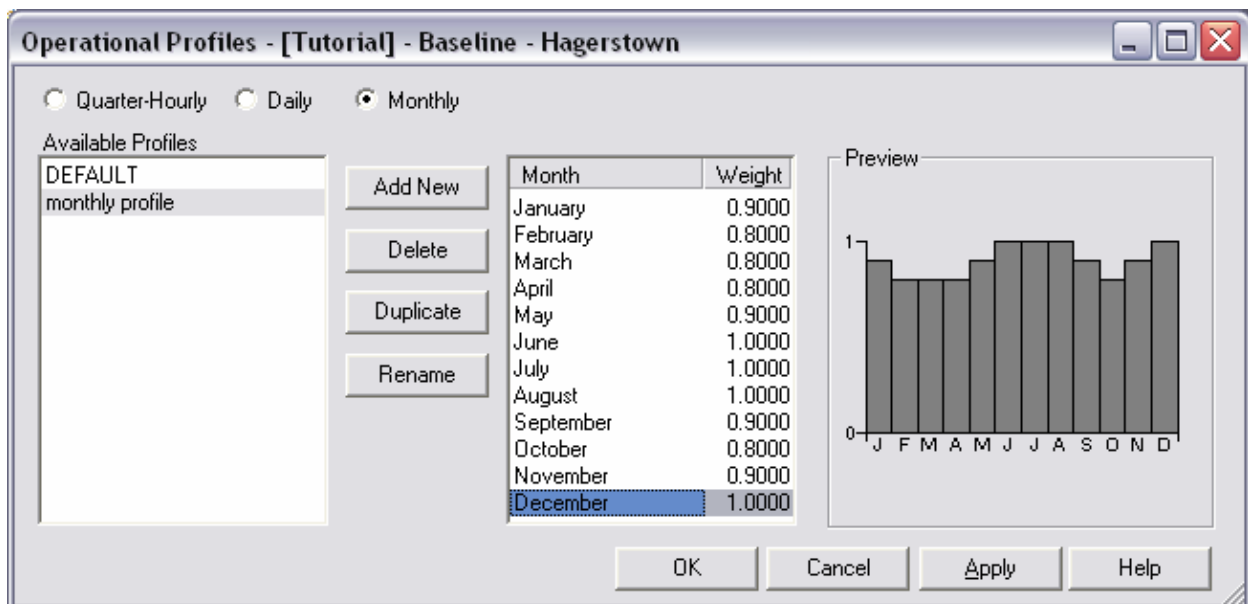
1. Select *Operational Profiles* from the *Utilities* menu.
2. Select the Monthly radio button.
3. Select the Add New button to create a new monthly profile.
4. Press Enter to accept the default name.

Result

This brings up the *Operational Profiles* window.

This displays the list of existing monthly profiles for the selected scenario-airport combination in the Available Profiles lists. There is always at least one profile named DEFAULT.

The newly created profile is ready to have its default name edited and has an initial distribution of 1 for each month.

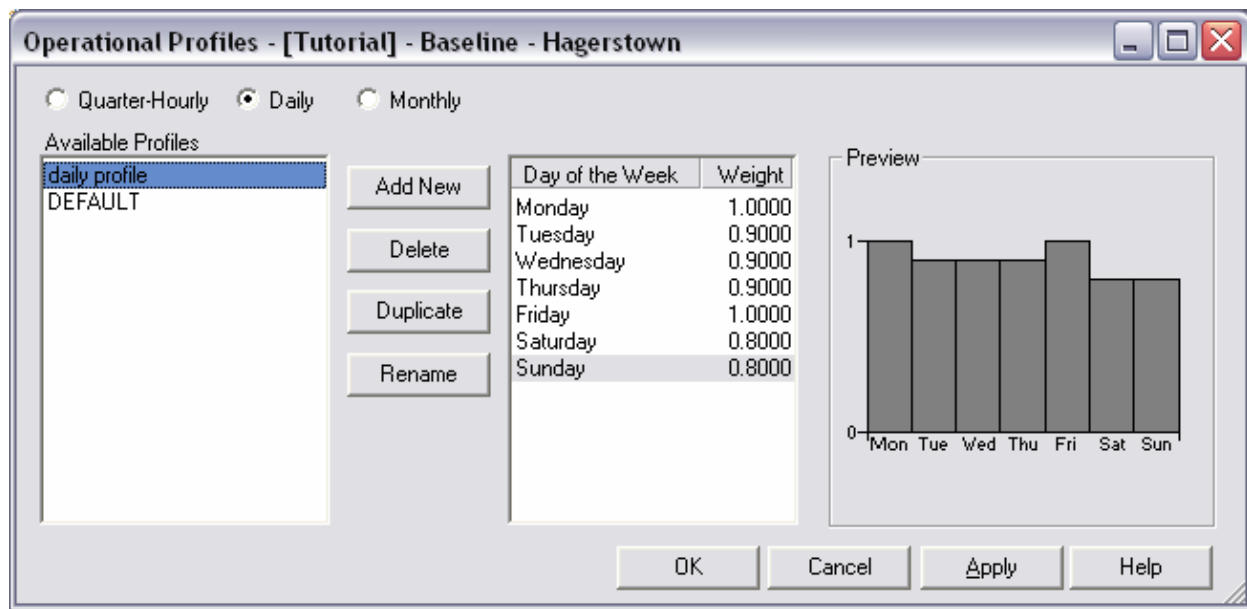


5. Double-click on the January Weight. Type “.9” and press Enter. Continue entering the other values in the profile as shown.
6. Click the Daily radio button.
7. Press the Add New button to create a new daily profile.

The monthly profile is defined.

Daily profiles are now displayed in the Available Profiles list.

The newly created profile is ready to have its default name edited and has an initial distribution of 1 for each day.



8. Double-click on the Tuesday Weight. Type “9” and press Enter. Continue entering the other values in the profile as shown. The daily profile is defined.

9. Press OK to apply the profiles. The dialog is closed.

A.3.3 Apply Operational Profiles to Aircraft

Action

1. Select *Aircraft* from the *Emissions* menu.
2. Select the aircraft and the *Operations* tab.
3. Select “daily profile” from the *Daily Profile* drop-down for both Arrivals and Departures.
4. Select “monthly profile” from the *Monthly Profile* drop-down for both Arrivals and Departures.
5. Press *OK* to apply changes.

Result

This reopens the Aircraft Operations & Assignments dialog.

The *Operations* tab is editable.

This changes the distribution of aircraft operations throughout the week. This can in turn alter what weather is in effect and the sequencing of ground movement, thus affecting emissions and later, dispersion.

This changes the distribution of aircraft operations throughout the year. As above, this can affect emissions and later, dispersion.

This also closes the dialog.

A.3.4 Setting Weather

We need to use hourly weather data to get the optimal results from the aircraft performance and emissions modules, and to select active airport configurations.

Action

6. Select *Weather* from the Airport menu.
7. Select the *Use Hourly Meteorological Data* radio button.
8. Press the *AERMET Wizard* button..

Result

This opens the *Weather* dialog for the Hagerstown airport.

This tells EDMS to use historical weather data instead of average airport values.

This starts the *AERMET Wizard*, provides a step-by-step interface that takes surface and upper-air data and merges it for AERMOD use. EDMS also uses one of the intermediate files that AERMET generates to extract the hourly weather for use within EDMS.

A.3.4.1AERMET Wizard Step 1. Surface Weather Data

The first step in the AERMET Wizard is to extract the surface weather data that will be used in the study.

Action

1. Press the button marked “...” (located after the Location input box) to select the surface weather file titled S93721_03.DAT
2. Set the Adjustment to Local Time to -5 (Eastern), which is where Hagerstown is located.
3. Press “Process”.

Result

This selects the surface weather file that we will use for this study. **Note: This is a fictitious set of weather data. It should not be used for regulatory analyses.** This file is found under your EDMS install directory in **Data\Tutorial\weather files**.

You may get a message asking if the file may be copied to the EDMSTEMP directory. If so, respond Yes.

The remaining necessary fields on the screen should be populated automatically.

The AERMET wizard will extract the surface weather data and the upper-air data screen will appear.

AERMET: Step 1. Extract & QA NWS Surface Data

Surface Data File

Location: C:\EDMSTEMP\S93721~1.DAT

Format: SCRAM

☐ Manually select the data file format

Adjustment to Local Time: -5 (Eastern) (hours)
(necessary if the data are reported in GMT)

Date Range

Start: 1/ 1/2003 End: 12/31/2003

Surface Weather Station

ID No.: 93721

Name: BALTIMORE BLT-WASHN

Latitude: 39.16 N

Longitude: 76.68 W

< Back Skip > Process Cancel Help

A.3.4.2AERMET Wizard Step 2. Upper Air Data.

The next step will be to extract the upper-air soundings that will be merged with the surface weather data.

Action

1. Press the button marked “...” to select the upper-air weather file titled 13701_92.ua.
2. Set the Adjustment to Local Time to -5 (Eastern).
3. Enter 39.16 for the Latitude and 76.68 for the longitude.
4. Press “Process”.

Result

This selects the upper-air weather file that we will use for this study. Note: This is a fictitious set of weather data. It should not be used for regulatory analyses.

This time we’ll also need to enter the latitude and longitude.

Provide the location of the weather station.

The AERMET wizard will extract the upper-air weather data and the merge screen will appear.

AERMET: Step 2. Extract & QA NWS Upper Air Data

Upper Air Data File

Location: C:\EDMSTEMP\13701_03.ua

Format: TD-6201 Fixed-Length Blocks

☐ Manually select the data file format

Adjustment to Local Time: -5 (Eastern) (hours)

Date Range

Start: 1/ 1/2003 End: 12/31/2003

Upper Air Weather Station

ID No.: 13701

Name:

Latitude: 39.16 N

Longitude: 76.68 W

< Back Skip > Process Cancel Help

A.3.4.3AERMET Wizard Step 3. Merge data.

Next, we need to merge the surface and upper-air data and create AERMOD weather files by taking the merged surface and upper-air weather data and converting it into surface (.sfc) and profile (.pfl) weather files that AERMOD can read.

Action

1. Uncheck the box labeled “Randomize NWS Wind Directions (+/- 5 degrees)”.
2. Make sure the box labeled “Substitute Missing On-Site Data with NWS Data” is checked.
3. Set the Time Zone to -5.
4. Press “Finish”.

Result

We do not want to randomize the wind data by 5° to either side of the reported wind direction.

Since we are not supplying any on-site data, we will have the AERMET Wizard use the surface data instead.

The AERMET Wizard has finished. We now return to the Weather dialog.

AERMET: Step 3. Merge Data & Create AERMOD Weather Files

Options

☐ Randomize NWS Wind Directions (+/- 5 degrees)

☒ Substitute Missing On-Site Data With NWS Data

Wind Height (meters)

Roughness (meters)

Date Range

Start End

Site Location

Time Zone (hours ahead of GMT)

Latitude

Longitude

Base File Name

The date range specified in this step determines the period for which AERMOD will run, and hourly weather data is used. The airport's annual averages are used for the remainder of the year for emissions inventory.

< Back Finish Process Cancel Help

A.3.4.4 Finishing Weather

Action

1. We could now adjust the *Mixing Height* or *Base Elevation*, but we will keep them as they are.
2. Press *OK* to apply the weather settings.

Result

The mixing height determines how far up the performance-based flight profile generator extends its profiles.

The *Weather* dialog is closed.

Weather - [Tutorial] - Baseline - Hagerstown

Mixing Height for Emissions Inventory (feet)

☐ Use Annual Averages

Parameter	Value	Units
Temperature	53.00	°F
Daily High Temperature	63.35	°F
Daily Low Temperature	42.65	°F
Pressure	29.92	inches of Hg
Sea Level Pressure	30.08	inches of Hg
Relative Humidity	64.13	%
Wind Speed	6.09	knots
Wind Direction	0.00	°
Ceiling	0.00	feet
Visibility	0.00	miles

☒ Use Hourly Meteorological Data (required for Dispersion)

AERMET Surface Observations File

Date Range: 01/01/03 to 12/31/03

AERMOD Surface File

Date Range: 01/01/03 to 12/31/03

AERMOD Profile File

Date Range: 01/01/03 to 12/31/03

Processed weather files are located in the corresponding Scenario and Airport folder under the Study directory.

Base Elevation (feet above MSL)

A.3.5 Adding Gates

Gates are needed to define taxipaths, which are used with other data by the sequence modeler to determine the taxi times for individual aircraft. Gates are also considered to be the theoretical point where GSE and APU's are used.

Action

1. Select *Gates* from the *Airport* menu.
2. Press *Add New* and create a gate called "Main". Set the *Elevation* to 686 feet, *Release Height* to 4.92 feet, and *Initial Sigma-Z* to 9.84 feet.. Change the number of points to 4.
3. Press *Add New* again and create another gate called "FBO". Set the *Elevation* to 703 feet, *Release Height* to 4.92 feet, and *Initial Sigma-Z* to 9.84 feet.. Change the number of points to 7.
4. Set the coordinates for Main and FBO to the values listed in Table A-1-1.
5. Press "OK".

Result

This brings up a window which allows you to specify information about the gates to be added to the study.

We will be creating two gates for this study.

This is the location for the gates called "Main" and "FBO".

This applies all of the changes made in this dialog.

Gates - [Tutorial] - Baseline - Hagerstown

Available

Add New
Add -->
<-- Remove
Delete
Duplicate
Rename

In Study

FBO
Main

Number of Points 7

Nudge
< >

Elevation 703 (feet)
Release Height 0 (feet)
Initial Sigma-Z 9.84 (feet)
Initial Sigma-Y (feet)

Point #	X (feet)	Y (feet)
1	603.67	721.78
2	940.81	806.12
3	918.53	1073.32
4	1026.43	1087.88
5	1003.01	1291.43
6	734.13	1513.90
7	586.88	1290.09

Preview

Points can only be entered in either clockwise or counter-clockwise order.

OK
Cancel
Apply
Help

A.3.6 Aircraft Taxiways

Now we must define the taxiways that connect the gates to the runways.

Action

1. Select *Taxiways* from the *Airport* menu.
2. Press *Add New* and create a new taxiway called "A".
3. Set the number of points to 6.
4. Set the coordinates of the taxiway to (1682.23, 289.86, 702.00), (1610.27, 791.08, 703.00), (147.93, 546.21, 699.00), (-475.53, 345.02, 695.00), (-3525.21, -149.66, 664), (-3557.15, -604.85, 659.00)
5. Repeat steps 2-4 for each of the taxiways listed in Table 1-2.
6. Press "OK".

Result

This brings up the *Aircraft Taxiways* window where we will specify the location of the taxiways that will be considered in our study.

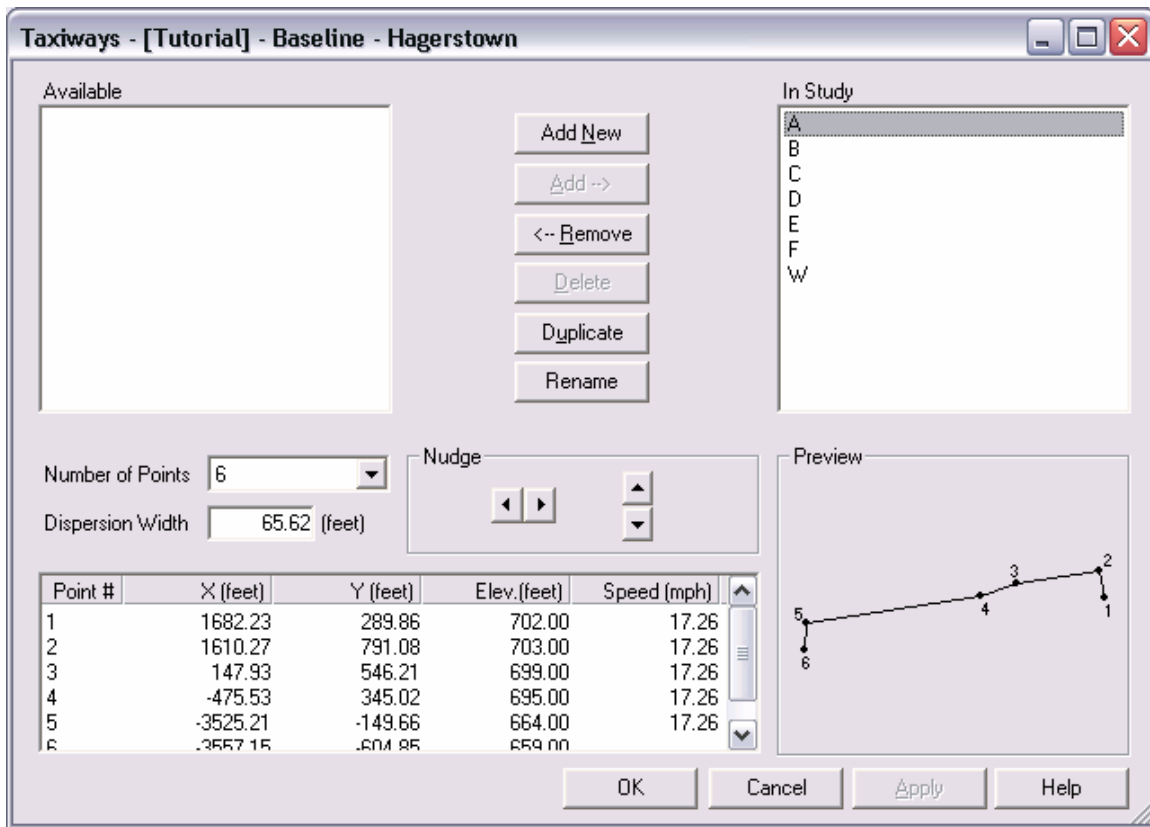
This prompts you for the name taxiway. We'll call it "A".

This taxiway has 5 segments, thus 6 points.

This specifies the location of the taxiway.

We need to add the remaining taxiways to the study. This defines the navigable connections between the gates and the runways.

This applies all of the changes made in this dialog.



A.3.7 Runways

We are now going to add the two runways at the airport.

Action

1. Select *Runways* from the *Airport* menu.
2. Add two new runways called “2-20” and “9-27”.
3. Set the coordinates for runways 2-20 and 9-27 to the coordinates specified in Table A-1-3.
4. Set the elevations of the runway ends to the values specified in Table A-1-3.
5. Set the Glide Slopes for all runway ends to 3°.
6. Press *OK*.

Result

This brings up the *Runways* dialog where we can specify the location and length of the runways in our study.

We are going to have two runways in the study.

This creates two runway that run roughly north-south and east-west.

Observe that runways do not have to be level.

These are the values used if *Use Runway Glide Slope* is selected for an aircraft on the *Performance* tab of the *Aircraft Operations & Assignments* dialog.

This applies the runway data and closes the *Runways* dialog.

Runways - [Tutorial] - Baseline - Hagerstown

Available

Add New
Add -->
<-- Remove
Delete
Duplicate

In Study

2-20
9-27

Preview

Name	X (feet)	Y (feet)	Elevation (feet)	Glide Slope (°)
9	-3615.49	-610.24	659	3
27	1682.23	289.86	702	3

OK
Cancel
Apply
Help

A.3.8 Taxipaths

We are now going to add the two runways at the airport.

Action

1. Select *Taxipaths* from the *Airport* menu.
2. Press *Add New*.
3. Select W in the *Available Taxiways* list and press *Add*.
4. Select C in the *Available Taxiways* list and press *Add*.
5. Continue adding taxipaths from Table A-1.6.
6. Press *OK*.
7. Select *Check Taxipaths* from the *Airport* menu.

Result

This brings up the *Taxipaths* dialog where we can specify the sequence of taxiways used to get from gate to runway and runway to gate.

When a new taxipath is created, it default to the first available taxipath that is both possible, given the airport layout, and not already in existence. The ordering for determining “first” is first, alphabetical by gate name, second, numerical order by runway, third, outbound before inbound, and fourth, alphabetical by runway exit. In our example, the first default taxipath is gate FBO, runway 2, outbound.

W appears in the *Taxiways in Taxipath* list.

C appears below W in the *Taxiways in Taxipath* list. Since FBO connects to W, which connects to C which connects to runway 2, we have a complete taxipath, so we move on to the next one.

The list of possible runway exits includes every taxiway that touch the runway, but since an aircraft travels a significant distance while decelerating enough that it can safely exit, not all of the exits are feasible. It is up to the user to omit the absurd taxipaths.

This applies the taxipath data and closes the *Taxipaths* dialog.

This will test to see if all the taxipaths entered are valid. If not, it will list all the problems. If a problem exists, look back at the definitions for gates, runways, taxiways and the taxipaths to find the cause of the disconnect and fix it. When all taxipaths are valid proceed to configurations.

Taxipaths - [Tutorial] - Baseline - Hagerstown

Gate	Runway	Direction	Runway Exit
FBO	2	Inbound	W
FBO	9	Outbound	
FBO	9	Inbound	A
FBO	9	Inbound	B
FBO	9	Inbound	C
FBO	20	Outbound	
FBO	20	Inbound	C
FBO	20	Inbound	F
FBO	27	Outbound	
FBO	27	Inbound	A
FBO	27	Inbound	D

Available Taxiways

A
B
C
D
E
F
W

Taxiways in Taxipath

W
C
A

Table A - 1.6 Taxipaths

Gate	Runway	Direction	Taxiways in Taxipath	Taxipaths
FBO	2	Outbound	W - C	FBO - W - C - 2
FBO	20	Outbound	W	FBO - W - 20
FBO	27	Outbound	B - A	FBO - B - A - 27
FBO	9	Outbound	W - C - A	FBO - W - C - A - 9
Main	2	Outbound	C	Main - C - 2
Main	20	Outbound	C	Main - C - 20
Main	27	Outbound	C - A	Main - C - A - 27
Main	9	Outbound	D - F	Main - D - F - 9
FBO	2	Inbound	W	2 - W - FBO
FBO	2	Inbound	A - B	2 - A - B - FBO
FBO	20	Inbound	C - W	20 - C - W - FBO
FBO	20	Inbound	F - C - W	20 - F - C - W - FBO
FBO	27	Inbound	A - C - W	27 - A - C - W - FBO
FBO	27	Inbound	D - A - C - W	27 - D - A - C - W - FBO
FBO	9	Inbound	A - B	9 - A - B - FBO
FBO	9	Inbound	B	9 - B - FBO
FBO	9	Inbound	C - W	9 - C - W - FBO
Main	2	Inbound	C	2 - C - Main

Main	20	Inbound	C	20 - C - Main
Main	20	Inbound	F - D	20 - F - D - Main
Main	27	Inbound	A - C	27 - A - C - Main
Main	27	Inbound	F - D	27 - F - D - Main
Main	27	Inbound	E - F - D	27 - E - F - D - Main
Main	27	Inbound	D	27 - D - Main
Main	9	Inbound	A - C	9 - A - C - Main
Main	9	Inbound	B - A - C	9 - B - A - C - Main
Main	9	Inbound	C - A - D	9 - C - A - D - Main

A.3.9 Configurations

We are now going to add the two runways at the airport.

Action

1. Select *Configurations* from the *Airport* menu.
2. Press *Add New* to add a new configuration. Name it North Wind.
3. Set the *Wind Direction From* and *To* to 340° and 40°, respectively.
4. In the *Airport Capacity* box set *Number of Points* to 2.
5. For point 1, set Arrivals per Hour to 35 and Departures per Hour to 55. For Point 2 set Arrivals per hour to 55 and Departures per Hour to 35.
6. In the Runway Assignments box, for small aircraft, runway 2, set the arrival, departure, and TGO percentages to 80, 80 and 90, respectively. For small aircraft, runway 9, set the percentages to 20, 20 and 10.
7. Finish filling in with the data from the tables below.
8. Press *OK* to apply (make available to the rest of the program) the data.

Result

This brings up the *Configurations* dialog where we can specify what airport configuration (allocation of runway usage) to use under what weather conditions.

When a new configuration is created, its default name is “configuration” (or “configuration(2)”, etc.).

This is the activation condition for this configuration.

Sets how many point will be used to bound the airport capacity curve.

This defines the capacity curve for this configuration. We can view the curve by checking *View Graph* in the *Airport Capacity* box. Uncheck *View Graph* to return to the numeric display.

This gives totals of 100% for small aircraft arrivals, departures and TGOs.

The configurations are defined.

The Configurations dialog closes.

Configuration	Activation parameters			Capacity		
	Parameter	From	To	Pt.	Arrivals	Departures
North Wind	Wind Dir.	340	40	1	35	55
	Wind Speed	no bound	no bound	2	55	35
	Hour of Day	no bound	no bound			
	Ceiling	no bound	no bound			
	Visibility	no bound	no bound			
	Temperature	no bound	no bound			
Northeast Wind	Wind Dir.	20	110	1	30	50
	Wind Speed	no bound	no bound	2	50	30
	Hour of Day	no bound	no bound			
	Ceiling	no bound	no bound			
	Visibility	no bound	no bound			
	Temperature	no bound	no bound			
Northwest Wind	Wind Dir.	270	0	1	30	50
	Wind Speed	no bound	no bound	2	50	30
	Hour of Day	no bound	no bound			
	Ceiling	no bound	no bound			
	Visibility	no bound	no bound			
	Temperature	no bound	no bound			
South Wind	Wind Dir.	160	220	1	35	55
	Wind Speed	no bound	no bound	2	55	35
	Hour of Day	no bound	no bound			
	Ceiling	no bound	no bound			
	Visibility	no bound	no bound			
	Temperature	no bound	no bound			
Southeast Wind	Wind Dir.	90	180	1	30	50
	Wind Speed	no bound	no bound	2	50	30
	Hour of Day	no bound	no bound			
	Ceiling	no bound	no bound			
	Visibility	no bound	no bound			
	Temperature	no bound	no bound			
Southwest Wind	Wind Dir.	200	290	1	30	50
	Wind Speed	no bound	no bound	2	50	30
	Hour of Day	no bound	no bound			
	Ceiling	no bound	no bound			
	Visibility	no bound	no bound			
	Temperature	no bound	no bound			

configuration	a/c size	Runways	arrivals	departures	TGOs
North Wind	S	2	80	80	90
	S	20	0	0	0
	S	27	0	0	0
	S	9	20	20	10
	L	2	10	10	0
	L	20	0	0	0
	L	27	0	0	0
	L	9	90	90	100
	H	2	0	0	0

	H	20	0	0	0
	H	27	0	0	0
	H	9	100	100	100
Northeast Wind	S	2	50	50	60
	S	20	0	0	0
	S	27	0	0	0
	S	9	50	50	40
	L	2	10	10	0
	L	20	0	0	0
	L	27	0	0	0
	L	9	90	90	100
	H	2	0	0	0
	H	20	0	0	0
	H	27	0	0	0
	H	9	100	100	100
Northwest Wind	S	2	50	50	60
	S	20	0	0	0
	S	27	50	50	40
	S	9	0	0	0
	L	2	10	10	0
	L	20	0	0	0
	L	27	90	90	100
	L	9	0	0	0
	H	2	0	0	0
	H	20	0	0	0
	H	27	100	100	100
	H	9	0	0	0
South Wind	S	2	0	0	0
	S	20	80	80	90
	S	27	20	20	10
	S	9	0	0	0
	L	2	0	0	0
	L	20	10	10	0
	L	27	90	90	100
	L	9	0	0	0
	H	2	0	0	0
	H	20	0	0	0
	H	27	100	100	100
	H	9	0	0	0
Southeast Wind	S	2	0	0	0
	S	20	50	50	60
	S	27	0	0	0
	S	9	50	50	40
	L	2	0	0	0
	L	20	10	10	0
	L	27	0	0	0
	L	9	90	90	100
	H	2	0	0	0
	H	20	0	0	0
	H	27	0	0	0
	H	9	100	100	100
Southwest	S	2	0	0	0

Wind	S	20	50	50	60
	S	27	50	50	40
	S	9	0	0	0
	L	2	0	0	0
	L	20	10	10	0
	L	27	90	90	100
	L	9	0	0	0
	H	2	0	0	0
	H	20	0	0	0
	H	27	100	100	100
	H	9	0	0	0

A.3.10 Emissions Results

At this point all of the inputs necessary for the emissions inventory have been entered into the program. We are ready to run the emissions inventory for the scenario. You can compare the results you obtained against the scenario provided with the software.

Action

2. Select *Run Emissions Inventory* from the *Emissions* menu.

Result

Notice that this runs a little more slowly than the first emissions inventory, since taxi times and flight profiles are both being computed dynamically. The results will appear automatically and should be identical to those as shown below.

EDMS 5.0 - [Tutorial : Emissions Inventory : Summary]

File Emissions Airport Dispersion View Utilities Window Help

Summary Aircraft by Mode Aircraft/APU GSE Population Vehicular Stationary Qualifier

Scenario - Airport Baseline - Hagerstown Year 2004 Units Pounds

Category	CO	THC	NMHC	VOC	NOx	SOx	PM-10	PM-2.5
Aircraft	9,095.139	2,578.710	2,578.710	2,822.914	11,018.154	1,249.793	86.529	86.529
GSE	67,326.077	2,787.973	2,551.240	2,661.271	11,767.085	1,002.250	440.706	425.798
APUs	1,834.342	105.020	105.020	105.020	484.327	101.963	0.000	0.000
Parking Facilities	924.784	156.501	150.548	149.821	66.536	0.645	1.224	0.860
Roadways	1,375.977	109.959	105.146	104.197	138.364	2.169	4.000	2.820
Stationary Sources	859.316	323.307	323.307	323.307	3,970.437	263.750	283.035	283.035
Training Fires	417.467	381.488	381.488	381.488	76.721	0.238	1,406.373	1,406.373
Grand Total	81,833.102	6,442.957	6,195.459	6,548.017	27,521.624	2,620.809	2,221.867	2,205.415

UNITS: Pounds/Year

For Help, press F1

NUM

A.4 A SAMPLE DISPERSION ANALYSIS

This example demonstrates how to model concentrations for the same airport used in the emissions inventory example. If the dispersion data has already been entered completely, we can now begin dispersion calculations.

A.4.1 Changing Scenario Options

Action

1. From the *File* menu select *Study Setup*.
2. Check *Enable Dispersion Modeling*.
3. Press *OK*.
4. Select the year 2004 in the study tree in the left pane of the main study window.

Result

This brings up the *Study Properties*.

This forces the scenario and weather options to what we used during the second emissions run.

This applies the changes made to this dialog and closes it.

We lost this selection when we opened the *Study Properties* dialog.

A.4.2 Additional Information Needed for Emissions Sources

Action

1. From the *Emissions* menu select *Aircraft*.
2. Select the *GSE & Gate Assignment* tab. Select the Boeing 737-300 aircraft. From the *Gate Assignment* drop-down select *Main*.
3. Press *OK* to apply the gate assignment.
4. From the *Emissions* menu select *GSE Population*.
5. For select *Air Conditioner* in the *In Study* list. In the *Gate Assignments* box, set both *FBO* and *Main* to 50%. Repeat for *Belt Loader*.
6. Press *OK* to apply the gate assignments.
7. From the *Emissions* menu select *Parking Facilities*.

Result

This brings up the *Aircraft Operations & Assignments* dialog.

This tells EDMS to use gate *Main* as the source location for the *GSE* and *APU* emissions associated with the Boeing 737-300.

This applies the changes made to this dialog and closes it.

This brings up the *GSE Population* dialog.

This tells EDMS how to distribution the emissions from the *GSE* population.

This applies the changes made to this dialog and closes it.

This brings up the *Parking Facilities* dialog.

Action

8. In the *Dispersion Parameters* box, set *Number of Levels* to 1, *Release Height* to 3.28 feet, *Elevation* to 686 feet.
9. Set *Number of Points* to 4 and enter these coordinates: (-1300, -1335), (-1030, -1390), (-1085, -1660), (-1355, -1605).
10. Press *OK* to apply the parking lot information.
11. From the *Emissions* menu select *Roadways*.
12. In the *Coordinates* box, set *Dispersion width* to 65.62 feet. Set *Number of Points* to 6 and enter these coordinates: (-1141, -2211), (-976, -1401), (-1019, -1346), (-1289, -1281), (-1354, -1324), (-1539, -2224), with all elevation 686 feet.
13. Press *OK* to apply the roadway information.
14. From the *Emissions* menu select *Stationary Sources*.
15. In the *Dispersion Parameters* box, select *Point*. Set (X, Y) to (-972, 812). Set *Elevation* to 695 feet, *Height* to 12 feet, *Velocity* to 15 (m/s), *Temperature* to 400 °F and *Diameter* to 3.28 feet.
16. Press *OK* to apply the stationary sources information.
17. From the *Emissions* menu select *Training Fires*.
18. In the *Coordinates* box, set *X* to -1974, *Y* to 1134 and *Elevation* to 678. In the *Dispersion Parameters* box, set *Release Height* to 13.12 feet, *Diameter* to 16.4 feet, *Gas Velocity* to 10 m/s and *Temperature* to 400 °F.
19. Press *OK* to apply the training fire information.

Result

- This provides EDMS with the information it need to define the parking emissions sources.
- This applies the changes made to this dialog and closes it.
- This brings up the *Roadways* dialog.
- This provides EDMS with the information it need to define the roadway emissions sources.
- This applies the changes made to this dialog and closes it.
- This brings up the *Stationary Sources* dialog.
- This provides EDMS with the information it need to define the stationary emissions sources.
- This applies the changes made to this dialog and closes it.
- This brings up the *Training Fires* dialog.
- This provides EDMS with the information it need to define the training fire emissions sources.
- This applies the changes made to this dialog and closes it.

A.4.3 Receptors

Before we can complete the dispersion analysis, we must specify the location of the receptors. For this analysis we will use polar coordinates to specify a ring of receptors in the southeast corner of the airport.

Action

1. Select *Receptors* from the *Dispersion* menu.
2. Select the tab labeled *Cartesian* under the Discrete Receptors heading.
3. Press *Add New* to create a Cartesian Receptor. Change its name to “Terminal”
4. Enter the coordinates (-1469.82, -1446.85) for the receptors location.
5. Leave the default Height and Elevation as they are.
6. Select the *Polar* tab under *Receptor Networks*.
7. Press *Add New* and create a receptor grid called “Perimeter”.
8. Select the *Origin Coordinates* radio button and enter (0, 0).
9. Set the *Rings Start* to 5000 ft, *Spacing* to 150, and *Count* to 1.
10. Set *Vectors Start* to 90, *Spacing* to 45 and *Count* to 4.
11. Press *OK* to apply the Receptors

Result

This brings up the *Receptors* menu.

We are going to place a receptor near the main terminal.

This creates a receptor at the origin.

This sets the receptor near to the gate “Main”, and the parking lot.

Height is 5.91 feet; elevation is 702.99 feet.

This allows us to enter Polar network.

This places the receptor grid in the In Study list and prepares it for input.

Establishes the center of our polar grid.

We’ll have a single ring of receptors about a mile from our origin..

The receptors are now available for use in dispersion.

Receptors - [Tutorial] - Baseline - Hagerstown

Discrete Receptors Receptor Networks Total number of receptors in study: 5

Cartesian Polar Cartesian Polar

Unused Networks

Add New

Add -->

<-- Remove

Delete

Duplicate

Rename

Decompose

Networks In Study

Perimeter

Origin Source

Type Gate

Name

Origin Coordinates (feet)

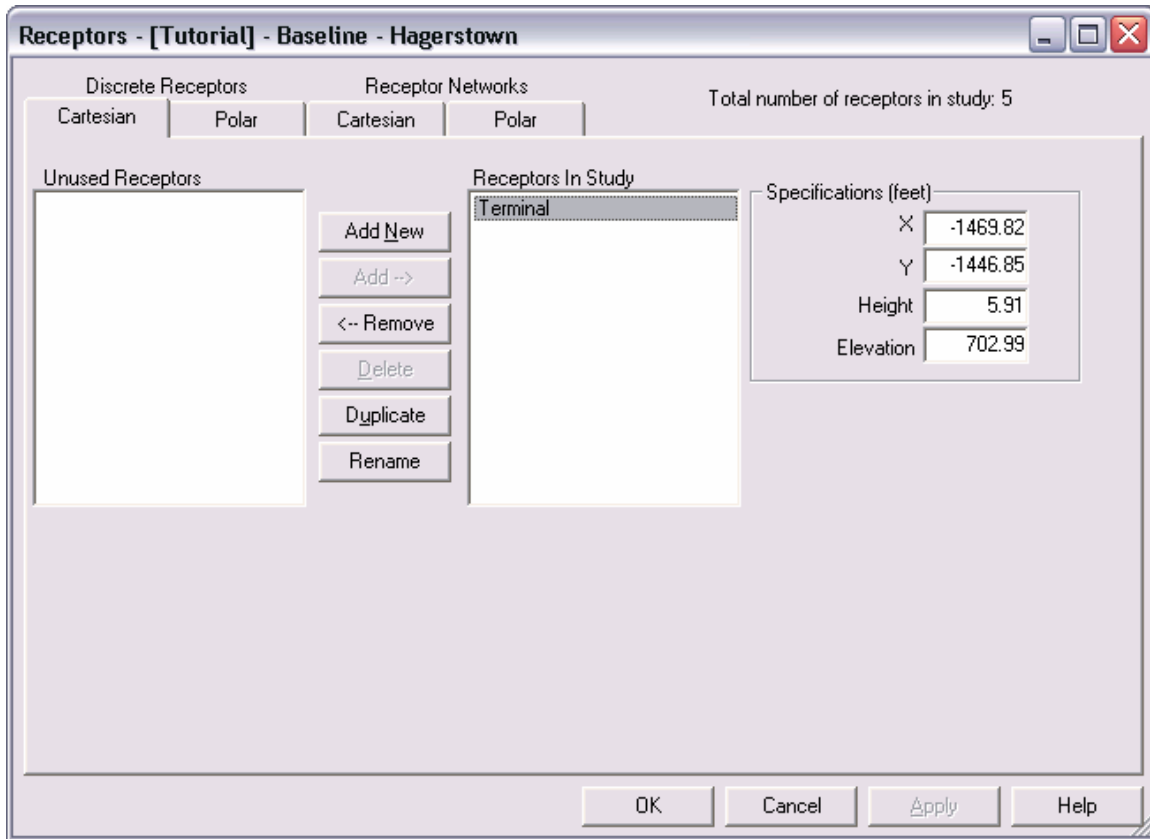
X 0 Y 0

Rings (feet)		Vectors (0-360)	
Start	5000		90
Spacing	150		45
Count	1		4

Height 5.91 (feet)

Elevation 702.99 (feet)

OK Cancel Apply Help



A.4.4 Buildings

We are now going to add the two buildings to the airport.

Action

1. Select *Buildings* from the *Airport* menu.
2. Add two new buildings called “Top Flight Airpark” and “Hangars”.
3. Set the coordinates for “Top Flight Airpark” and “Hangars” to those specified in Table A-1-4.
5. Press *OK*.

Result

This brings up the *Buildings* window where we can specify the location of the buildings in our study.

We are going to have two buildings in the study.

This specifies the location of the two buildings at the airport.

This applies the building data and closes the *Buildings* dialog.

Buildings - [Tutorial] - Baseline - Hagerstown

Available

Add New

Add -->

<-- Remove

Delete

Duplicate

Rename

In Study

Hangars

Top Flight Airpark

Number of Points8

Nudge

Elevation693 (feet)

Height4.92 (feet)

Point #	X (feet)	Y (feet)
1	-85.30	-1896.33
2	692.61	-2083.34
3	909.15	-1271.64
4	538.06	-1166.65
5	571.99	-924.14
6	344.49	-875.19
7	360.89	-622.83
8	255.91	-587.01

Preview

Points can only be entered in either clockwise or counter-clockwise order.

OK

Cancel

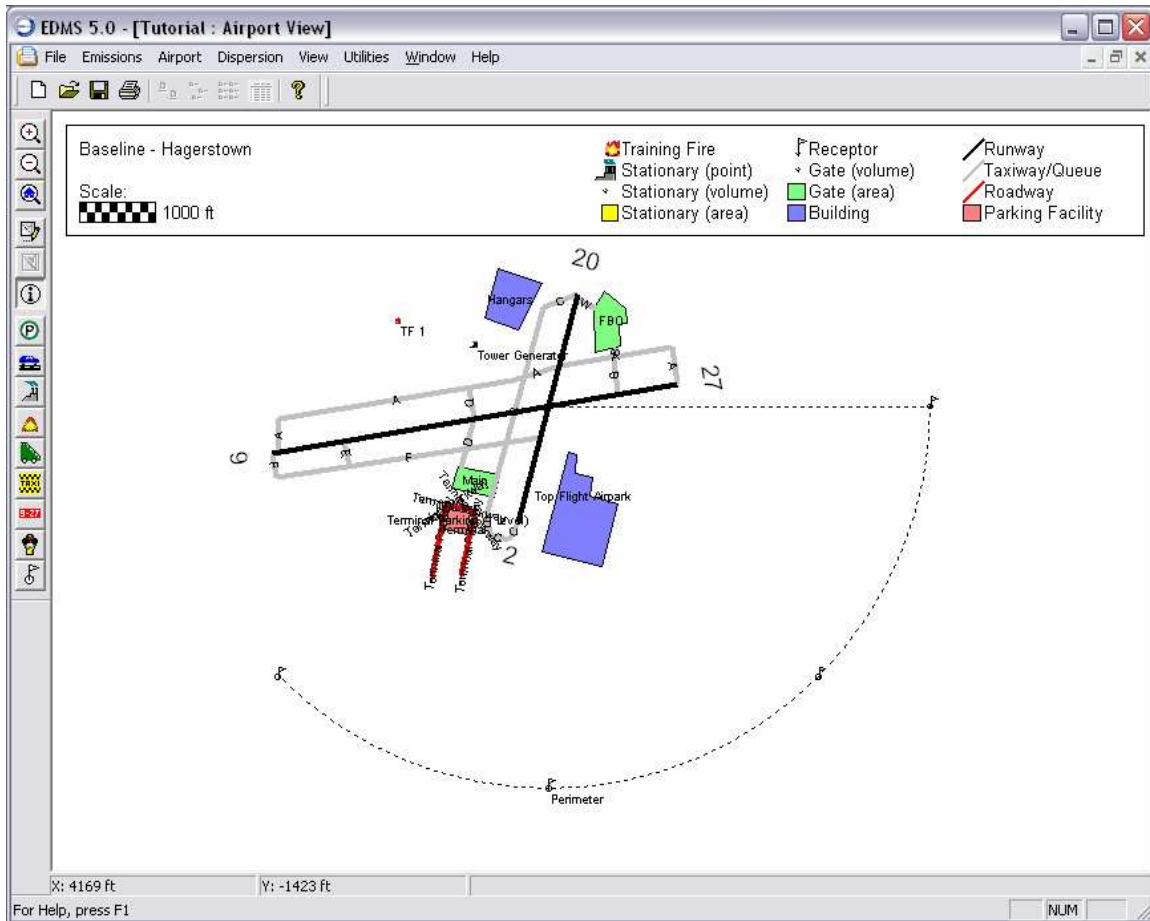
Apply

Help

A-42

A.4.1 Airport View & Wallpaper

To verify that we have placed all of our sources in the appropriate location we can look at a view of the airport that we have created. By selecting *Airport* from the *View* menu, the sources and receptors are presented in a graphical format. The figure below shows the airport view for this example.



Action

1. With the Airport View open select *Edit Wallpaper* from the view menu.
2. Specify the path of the bitmap file for Hagerstown airport. (HGR).
3. Click Next.
4. Enter (0, 0) for the study point coordinates.
5. Enter the coordinates (637, 792) for the image point coordinates as shown below.
6. Click Next.

Result

This brings up the wall paper wizard.

Locate the source of the airport bitmap.

Advances to step 2 to in the wallpaper wizard.

This puts the origin at the intersection of the two runways..

Advances to step 3 to in the wallpaper wizard.

Action

7. Enter 6.84 ft/pixels for the scale, and an image length of 1 as shown below.
8. Click Finish. The airport bitmap is shown below.

Result

This provides a scale for the bitmap.



Wallpaper Wizard: Step 2. Anchor Point...

Study Point

X

0

Y

0

(feet)

Image Point

637

792

Capture

Suggested Instructions:

1. Enter the X and Y values of the Study Point.
2. Click the Capture button.
3. Click in the Preview area to specify the Image Point.
4. Adjust the Image Point with the above arrow controls.

Preview

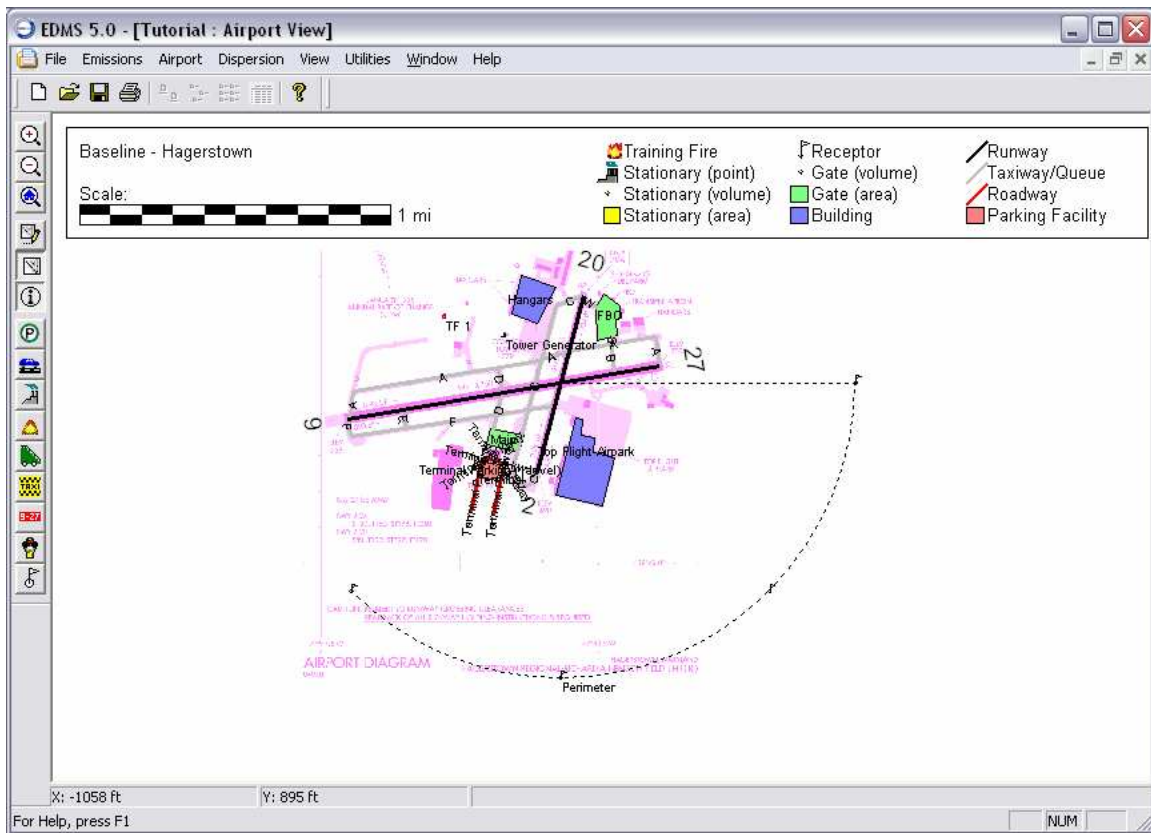
< Back

Next >

Cancel

Help





A.4.2 Run AERMAP

Our next step is to run the AERMOD terrain processor AERMAP.

Action

1. From the *Dispersion* menu, choose the *Process Terrain (AERMAP)*.
2. Select *Add Files* and choose Data\Tutorial\terrain files\baltimeore-w.dem.
3. Press “Run”.
4. Press “Close” to close the AERMAP dialog.

Result

This brings up the AERMAP interface window.

This instructs EDMS to include terrain data for our AERMOD processing.

This begins the terrain data processing.

This exits the AERMAP processor.

Run AERMAP

Input File(s)
USGS DEM Data Files
C:\Documents and Settings\sspriggs\Desktop
Add Files
Remove Files

Data Format ☒ 1 Degree ☐ 7.5 Minute

Processing Options
☐ Perform setup only. Do no processing.
☒ Extract BOTH hill heights AND source & receptor elevations.
☐ Extract hill heights ONLY.

Units ☒ Latitude & Longitude ☐ UTM's

Domain Limits

	SW Corner	NE Corner
Latitude	39.607944 N	39.807944 N
Longitude	77.8295 W	77.6295 W
Northing	4388070.04	4409749.35
Easting	257080.44	274904.71
UTM Zone	18	18

Reset Domain Limits

Run Cancel Help

A.4.3 Generating AERMOD Input Files

Our next step is to generate the input files that will be used by AERMOD to calculate our concentrations.

Action

1. From the *Dispersion* menu, choose the *Generate AERMOD Input Files* option.
2. Set the Title to “sample”.
3. Set the pollutant to CO and the averaging period set to 1 hour.
4. Press *Next*.
5. Unselect *Use AERMAP Generated Files* and press *Next*.
6. Check *Suspend Date Checking in Meteorological Files*
7. Press “Next”
8. Select 4th highest for *All Periods* and check *Tablulate File of All Concurrent Concentrations*.
9. Press “Generate”.

Result

This brings up the generate AERMOD input files wizard.

This instructs EDMS to generate a series of input files for AERMOD called sample with different extensions (e.g. sample.inp, sample.hre, etc.).

We are interested in 1-hour CO concentrations, so we will not change these settings.

Advance to Step 2 of AERMOD processing.

We will keep the default *Source Groups* settings. The AERMOD run will not include AERMAP terrain data (we just ran it to illustrate the process) and we are ready to move to Step 3 of AERMOD processing.

We will ignore the dates in the weather files.

Advance to Step 4 of AERMOD processing.

We have select which outputs we want to see.

The AERMOD input files will be generated and the window will be closed.

AERMOD: Step 1. Processing Control

Title:

Subtitle:

Pollutant: ☐ Multi-Year Pre-1997 NAAQS

☐ Stop AERMOD before Dispersion Processing

Averaging Periods

☒ 1 Hour
 ☐ 2 Hour
 ☐ 3 Hour
☐ 4 Hour
 ☐ 6 Hour
 ☐ 8 Hour
☐ 12 Hour
 ☐ 24 Hour
 ☐ Monthly
☐ Annual
 ☐ Entire Period of Study

☐ Apply Exponential Decay

☒ Half Life (secs)
☐ Decay Coefficient (1/secs)

Options

☐ Urban Effects
 Pop.: Roughness (m):
☐ Optimize Area Sources & Allow Use of SCIM
☐ Suppress Warning Messages

Restart Option (for interruptions)

Save File ...
 Init File ...

< Back Next > Cancel Help

AERMOD: Step 2. Sources & Receptors

Source Groups

☒ All
☒ Aircraft (all modes grouped together)
☐ Aircraft Approach Paths
☐ Aircraft Takeoffs (takeoff rolls & departure paths)
☐ Aircraft Landing Rolls
☐ Taxiways
☒ Gates (Aircraft Startup, GSE & APU's)
☒ Parking Facilities
☒ Roadways
☒ Stationary Sources
☒ Training Fires

☐ Use AERMAP generated elevations and hill heights

< Back Next > Cancel Help

AERMOD: Step 3. Meteorology

☒ Suspend Date Checking in Meteorological Files

Wind Correction (*)

☐ Sampled Chronological Input Model (SCIM)

Sampling Interval 1st Hour

Extracted Surface File

Extracted Profile File

< Back Next > Cancel Help

AERMOD: Step 4. Output Reporting

High Values by Receptor							Maximum Values	All Values	Generate Additional Files
	1st	2nd	3rd	4th	5th	6th			
All Periods	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="text" value="0"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> Tabulated File of All Concurrent Concentrations (necessary for View Concentrations) (.con)
1 Hour	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="text" value="0"/>	<input type="checkbox"/>	
2 Hour	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="text" value="0"/>	<input type="checkbox"/>	
3 Hour	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="text" value="0"/>	<input type="checkbox"/>	
4 Hour	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="text" value="0"/>	<input type="checkbox"/>	
6 Hour	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="text" value="0"/>	<input type="checkbox"/>	
8 Hour	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="text" value="0"/>	<input type="checkbox"/>	
12 Hour	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="text" value="0"/>	<input type="checkbox"/>	
24 Hour	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="text" value="0"/>	<input type="checkbox"/>	<input type="checkbox"/> Automatically run AERMOD after input file generation
Monthly	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="text" value="0"/>	<input type="checkbox"/>	

< Back Generate Cancel Help

A.4.4 Running AERMOD

Now we are ready to run AERMOD and generate concentrations.

Action

1. From the *Dispersion* menu, choose the *Run AERMOD* option.

Result

EDMS asks that we confirm we wish to run AERMOD for all analysis years for this scenario-and airport. Respond *Yes*.

A.4.5 Viewing Results

Now that AERMOD has finished running, we are ready to look at the results. See Figure B-2-16.

Action

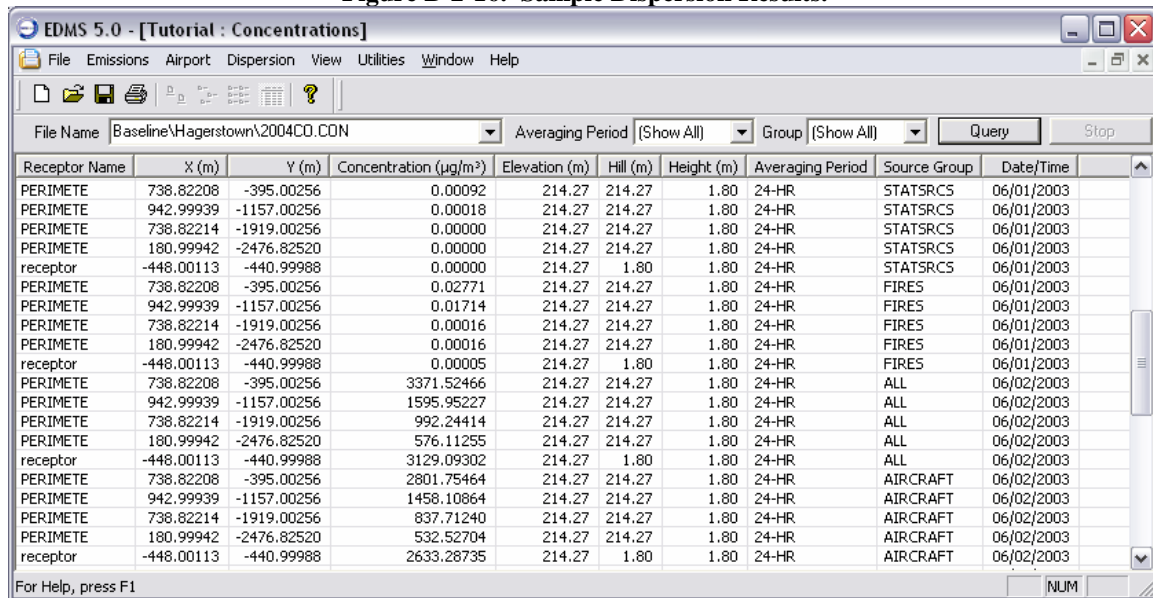
1. Select *View Concentrations* from the *View* menu option.
2. Select the “2004CO.CON” file and press the button labeled “Query”.

Result

After AERMOD has finished running, the results are saved in the output file that we previously specified. Select *View Concentrations* to access it.

This populates the table for viewing the concentrations from AERMOD.

Figure B-2-16. Sample Dispersion Results.



EDMS 5.0 - [Tutorial : Concentrations]

File Name: Baseline\Hagerstown\2004CO.CON Averaging Period: [Show All] Group: [Show All] Query Stop

Receptor Name	X (m)	Y (m)	Concentration (µg/m³)	Elevation (m)	Hill (m)	Height (m)	Averaging Period	Source Group	Date/Time
PERIMETE	738.82208	-395.00256	0.00092	214.27	214.27	1.80	24-HR	STATSRCS	06/01/2003
PERIMETE	942.99939	-1157.00256	0.00018	214.27	214.27	1.80	24-HR	STATSRCS	06/01/2003
PERIMETE	738.82214	-1919.00256	0.00000	214.27	214.27	1.80	24-HR	STATSRCS	06/01/2003
PERIMETE	180.99942	-2476.82520	0.00000	214.27	214.27	1.80	24-HR	STATSRCS	06/01/2003
receptor	-448.00113	-440.99988	0.00000	214.27	1.80	1.80	24-HR	STATSRCS	06/01/2003
PERIMETE	738.82208	-395.00256	0.02771	214.27	214.27	1.80	24-HR	FIRES	06/01/2003
PERIMETE	942.99939	-1157.00256	0.01714	214.27	214.27	1.80	24-HR	FIRES	06/01/2003
PERIMETE	738.82214	-1919.00256	0.00016	214.27	214.27	1.80	24-HR	FIRES	06/01/2003
PERIMETE	180.99942	-2476.82520	0.00016	214.27	214.27	1.80	24-HR	FIRES	06/01/2003
receptor	-448.00113	-440.99988	0.00005	214.27	1.80	1.80	24-HR	FIRES	06/01/2003
PERIMETE	738.82208	-395.00256	3371.52466	214.27	214.27	1.80	24-HR	ALL	06/02/2003
PERIMETE	942.99939	-1157.00256	1595.95227	214.27	214.27	1.80	24-HR	ALL	06/02/2003
PERIMETE	738.82214	-1919.00256	992.24414	214.27	214.27	1.80	24-HR	ALL	06/02/2003
PERIMETE	180.99942	-2476.82520	576.11255	214.27	214.27	1.80	24-HR	ALL	06/02/2003
receptor	-448.00113	-440.99988	3129.09302	214.27	1.80	1.80	24-HR	ALL	06/02/2003
PERIMETE	738.82208	-395.00256	2801.75464	214.27	214.27	1.80	24-HR	AIRCRAFT	06/02/2003
PERIMETE	942.99939	-1157.00256	1458.10864	214.27	214.27	1.80	24-HR	AIRCRAFT	06/02/2003
PERIMETE	738.82214	-1919.00256	837.71240	214.27	214.27	1.80	24-HR	AIRCRAFT	06/02/2003
PERIMETE	180.99942	-2476.82520	532.52704	214.27	214.27	1.80	24-HR	AIRCRAFT	06/02/2003
receptor	-448.00113	-440.99988	2633.28735	214.27	1.80	1.80	24-HR	AIRCRAFT	06/02/2003

For Help, press F1 NUM

Appendix B Import/Export File Formats

B.1. Introduction

This appendix details the import and export formats used by EDMS 5.0. EDMS 5.0 is only able to import files in this format, therefore study data exported from a previous version of EDMS must be re-formatted to match those listed below. This information is also contained in the on-line help for your convenience.

B.2. Format

The file to be imported should be a semicolon-delimited text file with the following format rules:

1. If the first character of a line is the pound sign, "#", the line is ignored as a comment.
2. If the first character of a line is an exclamation point, "!", or bang, EDMS assumes that a keyword will immediately follow.
3. Any lines not beginning with "#" or "!" are assumed to be data to be imported (if the last keyword was selected for import).
4. All files to be imported must begin with "!VERSION" followed by the EDMS version on the next line. This is the only required keyword for every EDMS import file.

B.3. Keywords

Table B-1 lists all of the keywords available in EDMS 5.0. Detailed import formats for each of the keywords follows the table.

Table B-1. EDMS 5.0 import keywords.

Keyword	Data Description
VERSION	The EDMS version of the file to be imported. Should be set to "11283001".
SETTINGS	General information about the modeled airport
SCENARIOS	Scenarios stored in the study.
AIRPORTS	Airports stored in the study.
YEARS	Years stored in the study.
PROPERTIES_FOR_SCENARIO-AIRPORT_COMBINATIONS	Properties for Scenario-Airport combinations
PROPERTIES_FOR_SCENARIO-AIRPORT-YEAR_COMBINATIONS	Properties for Scenario-Airport-Year combinations
AIRCRAFT_OPERATIONS	Aircraft operations entered into the study.
AIRCRAFT_GSE_ASSIGNMENTS	GSE-to-Aircraft assignments
AIRCRAFT_DEFINITIONS	Aircraft defined in the study.
ROADWAYS	Roadways.
PARKING_FACILITIES	Parking facilities.
TRAINING_FIRES	Training Fires
STATIONARY_SOURCES	Stationary sources.
GSE_POPULATION_GATE_ASSIGNMENTS	GSE population gate assignments.
GSE_POPULATION	GSE population.
QUARTER_HOURLY_PROFILES	Defined quarter-hourly profiles.
DAILY_PROFILES	Defined daily profiles.

MONTHLY_PROFILES	Defined monthly profiles.
BUILDINGS	Buildings.
GATES	Gates.
RUNWAYS	Runways.
TAXIWAYS	Taxiways.
TAXIPATHS	Taxipaths.
DISCRETE_CARTESIAN_RECEPTORS	Discrete Cartesian receptors.
DISCRETE_POLAR_RECEPTORS	Discrete polar receptors.
NETWORK_CARTESIAN_RECEPTORS	Network Cartesian receptors.
NETWORK_POLAR_RECEPTORS	Network polar receptors.
USER-CREATED_APUS	User-created APUs.
USER-CREATED_GSE	User-created GSEs.
USER-CREATED_AIRCRAFT	User-created aircraft.

VERSION

This keyword is required for all import files.

Number of fields: 1.

Field #	Description	Optional?
1	EDMS Version Number (should always be 11283001)	No

Example

```
!VERSION
11283001
```

AIRPORTS

Number of fields: 20

Field #	Description	Format	Optional?
1	In the study?	Boolean - T/F.	Yes; defaults to "F".
2	Airport name	Text; up to 100 characters.	No
3	System airport ID	Text; up to 9 characters.	No
4	IATA ID	Text; up to 3 characters.	No
5	Country code	Text; up to 2 characters.	No
6	ICAO ID	Text; up to 4 characters.	No
7	FAA ID	Text; up to 4 characters.	No
8	ICAO Region	Text; up to 1 character.	No
9	Engine region	Positive integer.	No
10	City name	Text; up to 50 characters.	No
11	State name	Text; up to 50 characters.	No
12	Country name	Text; up to 25 characters.	No
13	Elevation (Ft)	Numeric value with 2 decimal places.	No
14	Is in latitude/longitude?	"T" if coordinates are expressed as Latitude/Longitude. "F" if expressed in UTM.	If blank, UTM coordinates are assumed
15	Latitude (°)	Numerical value. Positive values are north. Negative values are south.	No, if latitude/longitude coordinates are selected.
16	Longitude (°)	Numerical value. Positive values are east. Negative values are west.	

17	Northing (m)	Numerical value. Positive values are north. Negative values are south.	No, if UTM coordinates are selected.
18	Easting (m)	Numerical value. Positive values are east. Negative values are west.	
19	UTM Zone	Positive integer.	
20	Description	Text; up to 1000 characters.	Yes

Example

```
!AIRPORTS
T ; Hagerstown ; 40078KHGR ; HGR ; US ; KHGR ; ; K ; 2 ; ; Maryland ;
United States of America ; 703.00 ; T ; 39.707944 ; -77.729500 ;
4398905.00 ; 266004.69 ; 18 ; Hagerstown Regional-Richard A Henson Fld
```

SCENARIOS

Number of fields: 7

Field #	Description	Format	Optional?
1	In the study?	Boolean - T/F.	Yes; will default to "F"
2	Scenario name	Text; up to 40 characters.	No
3	Is baseline?	Boolean - T/F.	Yes; empty will revert to non-baseline
4	Time-in-mode basis [Performance=0 ICAO=1]	Positive integer.	Yes; empty will revert to Performance
5	Taxi model [User=0 Delay=1 Sequencing=2]	Positive integer.	Yes; empty will revert to User
6	Sulfur conversion rate	Numeric value with 4 decimal places.	Yes; will default to 0.
7	Description	Text; up to 1000 characters.	Yes

Example

```
!SCENARIOS
T ; Baseline ; T ; 1 ; 0 ; 0.0050 ; Baseline Scenario.
```

PROPERTIES_FOR_SCENARIO-AIRPORT_COMBINATIONS

Number of fields: 20

Field #	Description	Format	Optional?
1	Scenario Airport	Positive integer.	No
2	Scenario name	Text; up to 40 characters.	No
3	Airport name	Text; up to 100 characters.	No
4	Mixing height (Ft)	Numeric value with 2 decimal places.	No
5	Use hourly met data?	Boolean - T/F.	Yes
6	Avg. temperature (°F)	Numeric value with 2 decimal places.	Yes
7	Daily high temp. (°F)	Numeric value with 2 decimal places.	Yes
8	Daily low temp. (°F)	Numeric value with 2 decimal places.	Yes
9	Pressure	Numeric value with 2 decimal places.	Yes

10	Pressure MSL	Numeric value with 2 decimal places.	Yes
11	Humidity (%)	Numeric value with 2 decimal places.	Yes
12	Wind Speed	Numeric value with 2 decimal places.	Yes
13	Wind Direction (°)	Numeric value with 2 decimal places.	Yes
14	Ceiling (ft)	Numeric value with 2 decimal places.	Yes
15	Visibility	Numeric value with 2 decimal places.	Yes
16	Aermet run?	Boolean - T/F.	Yes
17	AERMET output surface filename	Text; up to 250 characters.	Yes
18	AERMET output profile filename	Text; up to 250 characters.	Yes
19	AERMET intermediate output surface	Text; up to 250 characters.	Yes
20	Profile file base elevation (m)	Numeric value with 2 decimal places.	Yes

Example

```
!PROPERTIES_FOR_SCENARIO-AIRPORT_COMBINATIONS
1 ; Baseline ; Hagerstown ; 3000.00 ; T ; 53.00 ; 63.35 ; 42.65 ; 29.92 ;
30.08 ; 64.13 ; 6.09 ; 0.00 ; 0.00 ; 0.00 ; F ; BALT_13701.SFC ;
BALT_13701.PFL ; SFQAFIELD.MET ; 214.00
```

PROPERTIES_FOR_SCENARIO-AIRPORT-YEAR_COMBINATIONS

Number of fields: 8

Field #	Description	Format	Optional?
1	Scenario Airport	Positive integer.	Yes
2	Analysis year	Positive integer.	Yes
3	Default total taxi in time (min)	Numeric value with 2 decimal places.	Yes
4	Default total taxi out time (min)	Numeric value with 2 decimal places.	Yes
5	Default unimpeded taxi in time (min)	Numeric value with 2 decimal places.	Yes
6	Default unimpeded taxi out time (min)	Numeric value with 2 decimal places.	Yes
7	Use schedule?	Boolean - T/F.	Yes
8	Schedule filename	Text; up to 250 characters.	Yes

Example

```
!PROPERTIES_FOR_SCENARIO-AIRPORT-YEAR_COMBINATIONS
1 ; 2004 ; 7.00 ; 19.00 ; 0.00 ; 0.00 ; F ;
```


YEARS

Number of fields: 1

Field #	Description	Format	Optional?
1	Analysis year	4-digit integer 1990-2020	No

Example

```
! YEARS  
2005
```

QUARTER_HOURLY_PROFILES

Number of fields: 99

Field #	Description	Format	Optional?
1	Scenario Airport ID	Positive integer.	No
2	Profile ID	Positive integer.	No
3	Quarter-Hourly Operational Profile Name	Text; up to 20 characters.	No
4	Temporal factor for the first quarter-hour: (midnight - 12:15 am)	Number from 0 to 1 with up to 4 decimal places.	Yes
.	.	.	.
.	.	.	.
.	.	.	.
99	Temporal factor for the last quarter-hour: (11:45 pm - midnight)	Number from 0 to 1 with up to 4 decimal places.	Yes

Notes

0 will be entered if a numerical field is left blank or is a negative value.

1 will be entered if the value in the field is greater than 1.

Example

```
! QUARTER_HOURLY_PROFILES  
1 ; 0 ; DEFAULT ; 1.0000 ; ... ; 1.0000
```

DAILY_PROFILES

Number of fields: 10

Field #	Description	Format	Optional?
1	Scenario Airport ID	Positive integer.	No
2	Profile ID	Positive integer.	No
3	Daily Operational Profile Name	Text up to 20 characters	No
4	Temporal factor for Monday	Number from 0 to 1 with up to 4 decimal places	Yes
.	.	.	.
.	.	.	.
.	.	.	.

10	Temporal factor for Sunday	Number from 0 to 1 with up to 4 decimal places	Yes
----	----------------------------	--	-----

Notes

0 will be entered if a numerical field is left blank or is a negative value.

1 will be entered if the value in the field is greater than 1.

Example

```
!DAILY_PROFILES
1 ; 0 ; DEFAULT, 1.0000, 0.9000, 0.8000, 0.7500, 0.5000, 0.3000, 0.0000
```

MONTHLY_PROFILES

Number of fields: 15

Field #	Description	Format	Optional?
1	Scenario Airport ID	Positive integer.	No
2	Profile ID	Positive integer.	No
3	Monthly Operational Profile Name	Text up to 20 characters	No
4	Temporal factor for January	Number from 0 to 1 with up to 4 decimal places	Yes
.	.	.	.
.	.	.	.
.	.	.	.
15	Temporal factor for December	Number from 0 to 1 with up to 4 decimal places	Yes

Notes

0 will be entered if a numerical field is left blank or is a negative value.

1 will be entered if the value in the field is greater than 1.

Example

```
!MONTHLY_PROFILES
0 ; 1 ; DEFAULT, 1.0000, 0.9000, 0.8000, 0.7500, 0.5000, 0.3000, 0.0000,
0.9000, 0.8000, 0.7500, 0.5000, 0.3000
```

AIRCRAFT_DEFINITIONS

Number of fields: 19

Field #	Description	Format	Optional?
1	Scenario Airport	Positive integer.	No
2	Aircraft identifier	Positive integer.	No
3	ICAO aircraft code	Text; up to 15 characters.	Yes
4	ICAO Engine UID	Text; up to 10 characters.	Yes
5	User ID	Text; up to 40 characters.	Yes

6	Is User Created?	Boolean - T/F.	Yes
7	User aircraft name	Text; up to 40 characters.	Yes
8	Use annual ops	Boolean - T/F.	Yes
9	Departure Weight (lbs)	Positive integer.	Yes
10	Arrival Weight (lbs)	Positive integer.	Yes
11	Use runway glideslope	Boolean - T/F.	Yes
12	Glideslope angle (°)	Numeric value with 1 decimal places.	Yes
13	Use default APU	Boolean - T/F.	Yes
14	APU ID	Positive integer.	Yes
15	APU time - departures (min)	Numeric value with 2 decimal places.	Yes
16	APU time - arrivals (min)	Numeric value with 2 decimal places.	Yes
17	Use default GSEs	Boolean - T/F.	Yes
18	Gate name	Text; up to 20 characters.	Yes
19	Fuel sulfur content	Numeric value with 6 decimal places.	Yes

Example

!AIRCRAFT_DEFINITIONS

1 ; 1 ; B737-3; 1CM004; Airline ; F ; ; T ; 119900 ; 102600 ; F ; 3.0 ; T ; 20 ; 13.00 ; 13.00 ; T ; FBO ; 0.000680

AIRCRAFT_OPERATIONS

Number of fields: 18

Field #	Description	Format	Optional?
1	Scenario Airport ID	Positive integer.	No
2	Aircraft identifier	Positive integer. Must match an aircraft ID in the AIRCRAFT_DEFINITIONS section.	No
3	Analysis year	Positive integer.	No
4	Taxitime-outbound (min)	Numeric value with 2 decimal places.	Yes (set to 0 if blank)
5	Taxitime-inbound (min)	Numeric value with 2 decimal places.	Yes (set to 0 if blank)

Field #	Description	Format	Optional?
6	Departures count	Numeric value with 6 decimal places.	Yes (set to 0 if blank)
7	Departures profile - quarter-hourly	Positive integer. Must match a quarter-hourly profile ID, or the default will be used.	Yes (set to DEFAULT if left blank)
8	Departures profile - daily	Positive integer. Must match a daily profile ID, or the default will be used.	Yes (set to DEFAULT if left blank)
9	Departures profile - monthly	Positive integer. Must match a monthly profile ID, or the default will be used.	Yes (set to DEFAULT if left blank)
10	Arrivals count	Numeric value with 6 decimal places.	Yes (set to 0 if blank)
11	Arrivals profile - quarter-hourly	Positive integer. Must match a quarter-hourly profile ID, or the default will be used.	Yes (set to DEFAULT if left blank)
12	Arrivals profile - daily	Positive integer. Must match a daily profile ID, or the default will be used.	Yes (set to DEFAULT if left blank)
13	Arrivals profile - monthly	Positive integer. Must match a monthly profile ID, or the default will be used.	Yes (set to DEFAULT if left blank)
14	TGOs count	Numeric value with 6 decimal places.	Yes (set to 0 if blank)
15	TGOs profile - quarter-hourly	Positive integer. Must match a quarter-hourly profile ID, or the default will be used.	Yes (set to DEFAULT if left blank)
16	TGOs profile - daily	Positive integer. Must match a daily profile ID, or the default will be used.	Yes (set to DEFAULT if left blank)

Field #	Description	Format	Optional?
17	TGOs profile - monthly	Positive integer. Must match a monthly profile ID, or the default will be used.	Yes (set to DEFAULT if left blank)

Example

!AIRCRAFT_OPERATIONS

1 ; 1 ; 2004 ; 19.00 ; 7.00 ; 1000.000000 ; 0 ; 1 ; 1 ; 1000 ; 0 ; 1 ; 1 ; 0.000000 ; 0 ; 0 ; 0

AIRCRAFT_GSE_ASSIGNMENTS

Number of fields: 10

Field #	Description	Format	Optional?
1	Scenario Airport	Positive integer.	No
2	Aircraft identifier	Positive integer.	No
3	System GSE ID	Positive integer.	No
4	Fuel type (GDCLE)	1 character: "G" = Gasoline "D" = Diesel "C" = Compressed Natural Gas "L" = Liquid Propane Gas "E" = Electric	No
5	Operation departure time (mins/LTO)	Number from 0 to 480 with 2 decimal places allowed.	Yes. 0 will be used if this field is left blank.
6	Operation arrival time (mins/LTO)	Number from 0 to 480 with 2 decimal places allowed.	Yes. 0 will be used if this field is left blank.
7	GSE Horsepower (bhp)	Number appropriate to the equipment type and fuel burned, 0 to 10000 allowed. Blank for APUs.	Yes. 0 will be used if this field is left blank.
8	Loadfactor	Number from 0 to 1 with 4 decimal places allowed. Blank for APUs.	Yes. 0 will be used if this field is left blank.
9	Manufacture year	A 4-digit year or zero. Zero means the default average year of manufacture.	Yes. 0 will be used if this field is left blank.
10	Reference Model	Text; up to 100 characters.	Yes. 0 will be used if this

			field is left blank.
--	--	--	----------------------

Notes

The first 4 fields must form a unique combination; otherwise, the record is skipped.

Default values for operating time, brake horsepower and load factor will be assigned if all three of these fields are left blank. If the user intends to set zero emissions for a particular GSE assignment, only the operating time should be set to zero.

Example

```
! AIRCRAFT_GSE_ASSIGNMENTS
1 ; 1 ; 3 ; E ; 23.00 ; 7.00 ; 0 ; 0.7500 ; 0 ;
```

GSE_POPULATION

Number of fields: 19

Field #	Description	Format	Optional?
1	Scenario Airport	Positive integer.	No
2	Analysis year	Positive integer.	No
3	System GSE ID	Positive integer. Must match the ID of a system GSE.	No
4	Fuel type (GDCLE)	1 character: "G" = Gasoline "D" = Diesel "C" = Compressed Natural Gas "L" = Liquid Propane Gas "E" = Electric	No
5	User ID	Text; up to 40 characters.	No
6	GSE type	Text up to 30 characters. This name must match a GSE type in the system or user-created tables exactly.	No
7	Reference model	Text; up to 100 characters.	Yes
8	Population	Numeric; 0 to 10000	Yes; blank means 0.
9	Use annual figures?	"F" = hours per year "T" = minutes per peak hour	Yes (blank = "F")
10	Annual operations	Number between 0 and 8760.	Yes (this field can be left blank if peak hour minutes is specified)
11	Peak operations	Number from 0 to 60.	Yes (this field can be left blank if annual hours is specified)
12	Quarterly profile	Text up to 20 characters. This must match a Hourly Profile ID exactly.	Yes (set to DEFAULT if left blank)
13	Daily profile	Text up to 20 characters. This must match a Daily Profile ID exactly.	Yes (set to DEFAULT if left blank)

14	Monthly profile	Text up to 20 characters. This must match a Monthly Profile ID exactly.	Yes (set to DEFAULT if left blank)
15	Nonroad version	Positive integer.	Yes
16	Horsepower (bhp)	Integer 0 to 10000.	Yes (blank = 0)
17	Loadfactor	Number 0 to 1 with 4 decimal places.	Yes (blank = 0)
18	Use nonroad?	"T" = use Draft Nonroad Emission Factors "F" = use System Emission Factors	Yes (blank = "F")
19	Manufacture year	A 4-digit year.	Yes, if the Use NONROAD May 2004 draft data flag is "F".

Notes

If the annual hours/peak hour minutes flag is left blank or "F" and the annual hours is blank or 0, then the default annual usage will be assigned.

If both the brake horsepower and load factor are blank, zero or a combination of the two, then default values will be assigned to them.

Example

```
!GSE_POPULATION
1 ; 2004 ; 2 ; D ; #1 ; Air Conditioner ; ACE 804 ; 50 ; T ; 500 ; 0.85 ;
0 ; 0 ; 0 ; ; 210 ; 0.7500 ; F ; 2004
```

GSE_POPULATION_GATE_ASSIGNMENTS

Number of fields: 6

Field #	Description	Format	Optional?
1	Scenario Airport	Positive integer.	No
2	System GSE ID	Positive integer. This must match a GSE in the study.	No
3	Fuel type (GDCLE)	1 character: "G" = Gasoline "D" = Diesel "C" = Compressed Natural Gas "L" = Liquid Propane Gas "E" = Electric	No
4	User ID	Text; up to 40 characters.	No
5	Gate Name	Text up to 20 characters. This must match a gate name in the study.	No
6	Fraction assigned to gate	Number from 0 to 1.	Yes (blank = 0).

Example

!GSE_POPULATION_GATE_ASSIGNMENTS
 1 ; 2 ; D ; #1 ; Main ; 0.50

ROADWAYS

Number of fields: 88

Field #	Description	Format	Optional?
1	Scenario Airport	Positive integer.	No
2	Analysis year	Positive integer.	No
3	Roadway name	Text; up to 40 characters.	No
4	In the study?	T (for true) if this roadway should be in the active list F (for false) if this roadway should appear in the available list	Yes (blank = "F")
5	Use distribution?	Boolean - T/F.	Yes
6	Use annual figures?	T (for true) if the annual value is to be used. F (for false) if the peak hour value is to be used.	Yes (blank = "F")
7	Vehicle type	Integer from 0 to 16. 0 = Default Fleet Mix. 1 = Light Duty Vehicles (Passenger Cars) 2 = Light Duty Trucks 1 (0-6,000 lbs. GVWR, 0-3750 lbs. LVW) 3 = Light Duty Trucks 2 (0-6,000 lbs. GVWR, 3751-5750 lbs. LVW) 4 = Light Duty Trucks 3 (6,001-8500 lbs. GVWR, 0-3750 lbs. LVW) 5 = Light Duty Trucks 4 (6,001-8500 lbs. GVWR, 3751-5750 lbs. LVW) 6 = Class 2b Heavy Duty Vehicles (8501-10,000 lbs. GVWR) 7 = Class 3 Heavy Duty Vehicles (10,001-14,000 lbs. GVWR) 8 = Class 4 Heavy Duty Vehicles (14,001-16,000 lbs. GVWR) 9 = Class 5 Heavy Duty Vehicles (16,001-19,500 lbs. GVWR) 10 = Class 6 Heavy Duty	Yes (blank = 0)

Field #	Description	Format	Optional?
		Vehicles (19,501-26,000 lbs. GVWR) 11 = Class 7 Heavy Duty Vehicles (26,001-33,000 lbs. GVWR) 12 = Class 8a Heavy Duty Vehicles (33,001-60,000 lbs. GVWR) 13 = Class 8b Heavy Duty Vehicles (>60,000 lbs. GVWR) 14 = School Busses 15 = Transit and Urban Busses 16 = Motorcycles	
8	Fuel type (GDCLE)	1 character: "G" = Gasoline "D" = Diesel	Yes (blank = "G")
9	Manufacture year	A 4-digit year.	Yes, if the Vehicle Type Index is zero.
10	Number of vehicles per year	Number from 0 to 1000000000	One of these must be specified
11	Number of vehicles in a peak hour	Number from 0 to 100000	
12	Speed (mph)	Integer multiple of 5 from 5 to 65, inclusive, or 2.5	Yes (blank = 35 mph)
13	Round trip vehicle distance (miles)	Number from 0 to 4000 with 3 decimals allowed	Yes (only needed for emissions inventory only studies).
14	Quarter-hourly profile	Positive integer.	Yes (default will be used if this is left blank)
15	Daily profile	Positive integer.	
16	Monthly profile	Positive integer.	
17	User edited?	T (for true) if emissions factors are meant to override the MOBILE values F (for false) if MOBILE is to automatically generate the emission factors	Yes (blank = "F"). Leave blank or "F" to automatically assign MOBILE values.
18	CO (g/vehicle-mile)	Number from 0 to 2000.	Yes; if the user-edited emissions factors flag is "F", then MOBILE will
19	THC (g/vehicle-mile)	Number from 0 to 200.	

PARKING

Number of fields: 71

Field #	Description	Format	Optional?
1	Scenario Airport	Positive integer.	Yes
2	Analysis year	Positive integer.	Yes
3	Name	Text; up to 40 characters.	Yes
4	In the study?	T (for true) if this parking lot should be in the active list. Otherwise F (for false) if this parking lot should appear in the available list.	Yes
5	Use distribution?	Boolean - T/F.	Yes
6	Use annual figures?	T (for true) if the annual value is to be used. F (for false) if the peak hour value is to be used.	Yes (blank = "F")
7	Vehicle type	Integer from 0 to 16. 0 = Default Fleet Mix 1 = Light Duty Vehicles (Passenger Cars) 2 = Light Duty Trucks 1 (0-6,000 lbs. GVWR, 0-3750 lbs. LVW) 3 = Light Duty Trucks 2 (0-6,000 lbs. GVWR, 3751-5750 lbs. LVW) 4 = Light Duty Trucks 3 (6,001-8500 lbs. GVWR, 0-3750 lbs. LVW) 5 = Light Duty Trucks 4 (6,001-8500 lbs. GVWR, 3751-5750 lbs. LVW) 6 = Class 2b Heavy Duty Vehicles (8501-10,000 lbs. GVWR) 7 = Class 3 Heavy Duty Vehicles (10,001-14,000 lbs. GVWR) 8 = Class 4 Heavy Duty Vehicles (14,001-16,000 lbs. GVWR) 9 = Class 5 Heavy Duty Vehicles (16,001-19,500 lbs. GVWR) 10 = Class 6 Heavy Duty Vehicles (19,501-26,000 lbs. GVWR) 11 = Class 7 Heavy Duty Vehicles (26,001-33,000 lbs. GVWR) 12 = Class 8a Heavy Duty Vehicles (33,001-60,000 lbs. GVWR)	Yes (blank = 0)

Field #	Description	Format	Optional?
		13 = Class 8b Heavy Duty Vehicles (>60,000 lbs. GVWR) 14 = School Busses 15 = Transit and Urban Busses 16 = Motorcycles	
8	Manufacture year	A 4-digit year.	Yes, if the Vehicle Type Index is zero.
9	Average number of vehicles per year	Number 0 to 1000000000.	Yes (only needed if the peak hour value is not specified).
10	Number of vehicles in a peak hour	Number from 0 to 100000	Yes (only needed if the annual value is not specified).
11	Average speed in lot (MPH)	Integer multiple of 5 from 5 to 65, inclusive, or 2.5	Yes (blank = 10 mph)
12	Average distance traveled (meters)	Number 0 to 10000 with 6 decimals allowed	Yes (blank = 0)
13	Average Idle Time (minutes)	Number 0 to 30 with 1 decimal allowed	Yes (blank = 0)
14	Fuel type	1 character: "G" = Gasoline "D" = Diesel	Yes (blank = "G")
15	Quarter-hourly profile	Positive integer.	Yes (default will be used if this is left blank)
16	Daily profile	Positive integer.	
17	Monthly profile	Positive integer.	
18	User edited?	T (for true) if emission factors are provided to override the MOBILE values; otherwise F (for false)	Yes (blank = "F")
19	CO output (g/vehicle)	Number from 0 to 9999.99.	Yes
20	THC output (g/vehicle)	Number from 0 to 2000.	Yes
21	NMHC output (g/vehicle)	Number from 0 to 2000.	Yes
22	VOC output (g/vehicle)	Number from 0 to 2000.	Yes
23	NOx output (g/vehicle)	Number from 0 to 200.	Yes
24	SOx output (g/vehicle)	Number from 0 to 20.	Yes
25	PM-10 output (g/vehicle)	Number from 0 to 20.	Yes

Field #	Description	Format	Optional?
26	PM-2.5 output (g/vehicle)	Number from 0 to 20.	Yes
27	Number of Levels	Integer from 1 to 20, inclusive.	Yes
28	Top Release Height (m)	Number from 0 to 99.999999, inclusive.	Yes
29	Spacing (m)	Number from 1 to 99.999999, inclusive.	Yes
30	Elevation (m)	Numeric value with 6 decimal places.	Yes
31	Number of points used to define the parking lot	Integer 3 to 20.	Yes (Dispersion only)
32	x-coordinate 1 (meters)	Number within +/- 999999.999999	Yes (Dispersion only)
33	y-coordinate 1 (meters)	Number within +/- 999999.999999	Yes (Dispersion only)
	.	.	.
	.	.	.
	.	.	.
70	x-coordinate 20 (meters)	Number within +/- 999999.999999	Yes (if fewer than 20 points are used to define the parking lot)
71	y-coordinate 20 (meters)	Number within +/- 999999.999999	Yes (if fewer than 20 points are used to define the parking lot).

Example

```
!PARKING
Parking Facility, 1.50, 250.000000, 0, 0, F, 2.5, DEFAULT, DEFAULT,
DEFAULT, 62.40, 61.74, 14.26, 14.16, 1.10, 0.03, 0.01, 0.01, F, F, 1, 1,
3, 4, 610, 190, 710, 190, 710, 340, 610,
340,,,,,,,,,,,,,,,,,,,,,,,,,,,,, 1, G, 2000
```

STATIONARY_SOURCES

Number of fields: 100

Notes

If not using category **Other** and using system defaults, emissions parameters will be automatically set to the appropriate values and therefore the user may leave all the emissions factors fields blank.

Operational Parameter Fields

Field #	Description	Format	Optional?
1	Scenario Airport	Positive integer.	No
2	Analysis year	Positive integer.	No
3	Stationary source name	Text; up to 40 characters.	No
4	In the study?	"F" = available "T" = is the study	Yes (blank = "F", not in study)
5	Substance	Positive integer.	Yes
6	Yearly operations	Number from 0 to 20000000 with 2 decimals	Yes (blank = 0)
7	Hourly operations	Number from 0 to 200000 with 2 decimals	Yes (blank = 0)
8	By peak hour?	"F" = Annual "T" = Peak Hour	Yes (blank = "F", Annual)
9	Quarter-hour profile	Text up to 20 characters. This must match the name of an hourly profile exactly.	Yes (blank = "DEFAULT")
10	Daily profile	Text up to 20 characters. This must match the name of a daily profile exactly.	Yes (blank = "DEFAULT")
11	Monthly profile	Text up to 20 characters. This must match the name of a monthly profile exactly.	Yes (blank = "DEFAULT")

Emission Parameter Fields

Most emission parameter fields only apply to certain categories and types. Those that only apply to certain categories have been colored.

Field #	Description	Format	Optional?
12	Category code		
13	Type code	Text; up to 20 characters.	Yes
14	User edited?	"F" = use system defaults "T" = user edited values	Yes (blank = "F"). Is set to "T" if using category Other.
15	CO (kg/unit)	Number from 0 to 1000 with 4 decimals	Yes (blank = 0)
16	HC (kg/unit)	Number from 0 to 1000 with 4 decimals	
17	NOx (kg/unit)	Number from 0 to 1000 with 4 decimals	
18	SOx (kg/unit)	Number from 0 to 1000 with 4 decimals	
19	PM-10 (kg/unit)	Number from 0 to 1000 with 4 decimals	
20	PM-10 (1/unit)	Number from 0 to 1000 with 4 decimals	
21	Fuel Sulfur content (%)	Number from 0 to 99.99.	
22	Calcium-Sulfur ratio	Number from 0 to 9.9999	
23	Fuel ash content (%)	Number from 0 to 99.99.	
24	CO (%)	Number from 0 to 100.	

25	HC (%)	Number from 0 to 100.	
26	NOx (%)	Number from 0 to 100.	
27	SOx (%)	Number from 0 to 100.	
28	PM-10 (%)	Number from 0 to 100.	
29	Horsepower (hp)	Integer from 0 to 9999	
30	Time at 30% power (min)	Number from 0 to 999.99 (in minutes)	
31	Time at 85% power (min)		
32	Time at 100% power (min)		
33	Time at 7% power (min)		
34	Tank height (m)	Number from 0 to 999.99.	
35	Tank diameter (m)		
36	Maximum solution level (m)		
37	Average solution level (m)		
38	Reid Vapor Pressure (PSI)	Integer from 6 to 13, inclusive.	Yes (blank = 6)
39	Solution Density (g/L)	Number from 0 to 1999.9	Yes (blank = 0)
40	Solution Concentration (%)	Number from 0 to 99.99	
41	Surface area m²	Number from 0 to 9999	
42	Mass per Disturbance (Metric tons)	Number from 0 to 999.999	
43	Moisture (%)	Number from 0.01 to 99.99	Yes (blank = 0.01)
44	Mean wind speed (m/s)	Number from 0 to 99.99	Yes (blank = 0)
45	Fast mile (m/s)		
46	Friction speed (m/s)		
47	Roughness (cm)	Number from 0.01 to 99.99	Yes (blank = 0.01)
48	Surface to approaching wind speed ratio	Number from 0 to 1, inclusive	Yes (blank = 0)
49	ICAO Engine UID	Text up to 40 characters. This name must match an engine in the system or user-created tables.	One must be entered if Aircraft Engine Testing is selected.
50	User aircraft name	Text up to 40 characters. This name must match an engine in the system or user-created tables.	

Dispersion Parameter Fields

Field #	Description	Format	Optional?
52	Base Elevation (meters)	Number within +/- 999999.999999	Yes (blank = 0)

4	In the study?	"F" = available "T" = in study	Yes (blank = "F", not in study)
5	User edited?	"F" = system emission factors "T" = edited by the user	Yes (blank = "F")
6	Elevation (m)	Number from 1 to 15 with 6 decimals	Yes (blank = 1)
7	x-coordinate (meters)	Number within +/- 999999.999999	Yes
8	y-coordinate (meters)	Number within +/- 999999.999999	Yes
9	Quarter-hourly profile	Positive integer.	Yes; blank means use default
10	Daily profile	Positive integer.	
11	Monthly profile	Positive integer.	
12	Gallons per year (gal)	Number from 0 to 999999999 with 2 decimals	Yes (blank = 0)
13	Gallons per hour (gal)	Number from 0 to 999999 with 2 decimals	
14	Use hourly operations?	Boolean - T/F.	Yes
15	Fuel type	"JP-4", "JP-5", "JP-8", "Propane" or "Tekflame"	No
16	Temperature (°F)	Number from 100 to 600 with 2 decimals	Yes (blank = 100°F, see note.)
17	Diameter (m)	Number from 1 to 15 with 2 decimals	Yes (blank = 1 m, see note.)
18	Velocity (m/s)	Number from 1 to 30 with 2 decimals	Yes (blank = 1 m/s, see note.)
19	Release height (m)	Numeric value with 6 decimal places.	Yes
20	CO Emission Factor (grams/gallon)	Number from 0 to 3000	Yes (blank = 0). If the User-Edited Emission Factor flag is "F", then these are set to the values for the specified fuel.
21	HC Emission Factor (grams/gallon)	Number from 0 to 100	
22	NOx Emission Factor (grams/gallon)	Number from 0 to 100	
23	SOx Emission Factor (grams/gallon)	Number from 0 to 10	
24	PM-10 Emission Factor	Number from 0 to 1000	

	(grams/gallon)		
--	----------------	--	--

Notes

If temperature is blank or 100, then it is set to the default value of 400°F.

If diameter is blank or 1 then it is set to the default value of 5 meters.

If velocity is blank or 1, then it is set to the default value of 10 m/s.

Example

```
!TRAINING_FIRES
1 ; TF1 ; 2004 ; T ; F ; 214.270000 ; 0.000000 ; 0.000000 ; 4.000000 ; 0
; 0 ; 0 ; 12000.00 ; 0.34 ; T ; JP-4 ; 400.00 ; 5.000000 ; 10.00 ;
4.000000 ; 1625.680000 ; 58.060000 ; 12.190000 ; 1.720000 ; 435.440000
```

GATES

Number of fields: 48

Field #	Description	Format	Optional?
1	Scenario Airport	Positive integer.	No
2	In the study?	"F" = available "T" = in study	Yes (blank = "F", not in study)
3	Gate name	Text; up to 40 characters.	No
4	Elevation (m)	Numeric value with 6 decimal places.	Yes
5	Release height (m)	Number 0 to 100 with 6 decimals allowed	Yes (blank = 0)
6	sigmay0 (m)	Numeric value with 6 decimal places.	Yes
7	sigmaz0 (m)	Numeric value with 6 decimal places.	Yes
8	Number of points	Positive integer.	Yes (blank = 1). If set to 2, it is reset to 1.

9	x-coordinate 1 (meters)	Number within +/- 999999.999999	Yes (blank = 0)
10	y-coordinate 1 (meters)	Number within +/- 999999.999999	Yes (blank = 0)
.	.	.	.
.	.	.	.
47	x-coordinate 20 (meters)	Number within +/- 999999.999999	Yes (if fewer than 20 points are used to define the gate)
48	y-coordinate 20 (meters)	Number within +/- 999999.999999	Yes (if fewer than 20 points are used to define the gate).

Example

!GATES

1 ; T ; Main ; 209.092800 ; 0.000000 ; 16 ; 3 ; 4 ; -384.998976 ; -
321.000120 ; -218.288616 ; -361.657392 ; -194.105784 ; -269.900400 ; -
361.998768 ; -237.518448 ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ;
; ; ; ; ; ; ; ;

TAXIWAYS

Number of fields: 84

Field #	Description	Format	Optional?
1	Scenario Airport	Positive integer.	No
2	In the study?	T (for true) if this taxiway should be in the active list. Otherwise F (for false) if this taxiway should appear in the available list.	Yes (blank = "F")
3	Taxiway name	Text; up to 20 characters.	No
4	Point count	Positive integer.	No, must be at least 2.
5	Width (m)	Number from 1 to 99.99	Yes (blank = 1)
6	x-coordinate 1 (m)	Number within +/- 999999.999999	Yes (blank = 0)
7	y-coordinate 1 (m)		
8	z-coordinate 1 (m)		
9	Point #1 to #2 speed (mph)	Number from 0 to 60 with 2 decimals allowed	Yes (blank = 30)
.	.	.	.
.	.	.	.
.	.	.	.

! RUNWAYS

```
1 ; 2 ; 20 ; -119.868696 ; -463.000344 ; 116.631720 ; 451.253352 ;
3.000000 ; 3.000000 ; T ; 210.312000 ; 214.579200
```

Number of fields: 46

Example

```
1 ; Hangars ; T ; 212.750400 ; 1.500000 ; 4 ; -254.514096 ; 356.000304 ;  
-122.977656 ; 305.001168 ; -25.975056 ; 491.813088 ; -203.999592 ;  
551.812968 ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ;  
;
```

Number of fields: 36

B-25

4	Use distribution?	“T” – use capacity distribution curve. “F” – do not.	Yes (blank = “F”)
5	Percent used	Proportion of time the configuration is used. (0 to 1, two decimal points)	Yes (blank = 0)
6	Minimum wind angle (°)	Integer from 1 to 360, inclusive	Yes (blank = 1)
7	Maximum wind angle (°)		
8	Use minimum wind angle?	Boolean value – “T” or “F”.	Yes (blank = “F”)
9	Use maximum wind angle?		
10	Minimum windspeed	Number from 0 to 99.99 with 2 decimals allowed	Yes (blank = 0)
11	Maximum windspeed		
12	Use minimum windspeed?	Boolean value – “T” or “F”.	Yes (blank = “F”)
13	Use maximum windspeed?		
14	Minimum hour (hrs)	Number from 0 to 24 with 2 decimals allowed	Yes (blank = 0)
15	Maximum hour (hrs)		
16	Use minimum hour?	Boolean value – “T” or “F”.	Yes (blank = “F”)
17	Use maximum hour?		
18	Minimum ceiling (ft)		Yes (blank = 0)
19	Maximum ceiling (ft)		
20	Use minimum ceiling?	Boolean value – “T” or “F”.	Yes (blank = “F”)
21	Use maximum ceiling?		
22	Minimum visibility		Yes (blank = 0)
23	Maximum visibility		
24	Use minimum visibility?	Boolean value – “T” or “F”.	Yes (blank = “F”)
25	Use maximum visibility?		
26	Minimum temperature (°F)		Yes (blank = 0)
27	Maximum temperature (°F)		
28	Use minimum temperature?	Boolean value – “T” or “F”.	Yes (blank = “F”)
29	Use maximum temperature?		
30	Number of points	Numer of points in the capacity distribution (1 to 3)	Yes, if “Use Distribution” is “F”
31	Arrivals capacity 1	Number of arrivals possible in the first capacity point.	Yes (blank = 0)
32	Departures capacity 1	Number of departures possible in the first capacity point.	Yes (blank = 0)
33	Arrivals capacity 2	Number of arrivals possible in the second capacity point.	Yes (blank = 0)
34	Departures capacity 2	Number of departures possible in the second capacity point.	Yes (blank = 0)
35	Arrivals capacity 3	Number of arrivals possible in the third capacity point.	Yes (blank = 0)
36	Departures capacity 3	Number of departures possible in the third capacity point.	Yes (blank = 0)

Notes

The wind angle range used by a configuration will be the clockwise arc from the start angle to the end angle. The wind angle is the direction from which the wind is blowing. For example, winds

out of the north correspond to 360 degrees. Wind angles for configurations should be thought of as discrete vectors with 360 possible directions, as opposed to having the continuity of a complete circle.

Example

```
!RUNWAY_CONFIGURATIONS
1 ; configuration ; T ; F ; 0.40 ; 340 ; 40 ; T ; T ; 0.00 ; 0.00 ; F ; F
; 0 ; 0 ; F ; F ; 0 ; 0 ; F ; F ; 0 ; 0 ; F ; F ; 0 ; 0 ; F ; F ; 2 ; 35
; 55 ; 55 ; 35 ; ;
```

TAXIPATHS

Number of fields: 6

Field #	Description	Format	Optional?
1	Scenario Airport	Positive integer.	No
2	Gate name	Text; up to 20 characters. Must exactly match defined gate.	No
3	Runway name	Text; up to 20 characters. Must exactly match defined runway.	No
4	Runway exit	Text; up to 20 characters. Must exactly match a defined taxiway that connects to the selected runway.	No
5	Is outbound?	T=true, represents a path from gate->runway. F=false, represents a path from runway->gate	Yes; defaults to inbound
6	Taxiway name	Text; up to 20 characters. Must exactly match defined taxiway.	No

Notes

The first 5 fields are used to identify a record as being a segment in a specific taxipath.

Example

```
!TAXIPATHS
1 ; Main ; 2 ; ; T ; W
```

CONFIGURATION_RUNWAYS

Number of fields: 7

Field #	Description	Format	Optional?
1	Scenario Airport	Positive integer.	No
2	Configuration name	Text up to 20 characters. This name must match the name of a configuration in the study exactly.	No
3	Aircraft size	Text; 1 character.	No
4	Runway end name	Text up to 3 characters. This must match a runway end name in the study.	No

5	Fraction of the aircraft's LTOs to use the runway for landings	Number from 0 to 1, inclusive.	Yes. EDMS sets this to 0 if left blank.
6	Fraction of the aircraft's LTOs to use the runway for takeoffs		
7	Fraction of the aircraft's TGOs to use the runway		

Example

!CONFIGURATION_RUNWAYS

1 ; configuration ; S ; 2 ; 0.8000 ; 0.8000 ; 0.9000

NETWORK_CARTESIAN_RECEPTORS

Number of fields: 11

Field #	Description	Format	Optional?
1	Scenario Airport	Positive integer.	No
2	Receptor network name	Text; up to 40 characters.	No
3	In the study?	T (for true) if this receptor should be in the active list. Otherwise F (for false) if this receptor should appear in the available list.	Yes (blank = "F", not in study)
4	Start coordinate x- (meters)	Number within +/- 999999.999999	Yes (blank = 0)
5	Start coordinate y- (meters)		
6	X-count	Integer from 1 to 100	Yes (blank = 1)
7	Y-count		
8	X-delta (m)	Number from 1 to 1000 with 6 decimals allowed	
9	Y-delta (m)		
10	Height (m)	Number 0 to 10 meters with 6 decimals allowed	Yes (blank = 0)
11	Elevation (m)	Numeric value with 6 decimal places.	Yes (blank = 0)

Example

!NETWORK_CARTESIAN_RECEPTORS

1 ; CARTGRID ; T ; 0.000000 ; 0.000000 ; 1 ; 1 ; 45.720000 ; 45.720000 ; 1.800000 ; 214.270000

NETWORK_POLAR_RECEPTORS

Number of fields: 16

Field #	Description	Format	Optional?
1	Scenario Airport	Positive integer.	No
2	Receptor name	Text; up to 40 characters.	No
3	In the study?	T (for true) if this receptor should be in the active list. F (for false) if this receptor should appear in the available list.	Yes (blank = "F", not in study)
4	Is source based?	T (for True), if the network of receptors is centered around a source. F (for False), if coordinates for the center will be specified.	Yes (blank = "F", not source based)
5	Source type	Text, must be one of the following values: "Gate", "Parking Lot", "Roadway", "Runway", "Stationary Source", "Taxiway", or "Training Fire"	Yes (Should not be blank for source based networks, but should be blank if not source based).
6	Source name	Text up to 40 characters. Must match the origin source name exactly.	Yes (This field can be left blank if not source based).
7	X-origin (m)	Number from -999999.999999 to 999999.999999	Yes (This field can be left blank if source based).
8	Y-origin (m)		
9	R-start (m)	Number from 1 to 999999.999999	Yes (blank = 1)
10	D-start (°)	Numeric value with 6 decimal places.	Yes (blank = 0)
11	R-count	Number from 1 to 100	Yes (blank = 1)
12	D-count	Number from 1 to 36	
13	R-delta (m)	Number from 1 to 1000	
14	D-delta (°)	Number from 1 to 90	

15	Height (m)	Number 0 to 10 with 6 decimals allowed	Yes (blank = 0)
16	Elevation (m)	Numeric value with 6 decimal places.	Yes

Example

```
!NETWORK_POLAR_RECEPTORS
1 ; Perimeter ; T ; T ; Gate ; Main ; -581.000616 ; -1157.002512 ;
1524.000000 ; 60.000000 ; 1 ; 4 ; 45.720000 ; 30.000000 ; 1.801368 ;
214.271352
```

DISCRETE_CARTESIAN_RECEPTORS

Number of fields: 5

Field #	Description	Format	Optional?
1	Scenario Airport	Positive integer.	No
2	Name	Text; up to 40 characters.	No
3	In the study?	T (for true), if this receptor should be in the active list. F (for false), if this receptor should appear in the available list.	Yes (blank = "F", not in study)
4	X (m)	Number within +/- 999999.999999	Yes (blank = 0)
5	Y (m)		
6	Height (m)		
7	Elevation (m)		

Example

```
!DISCRETE_CARTESIAN_RECEPTORS
1 ; Terminal ; T ; -448.001136 ; -440.999880 ; 1.801368 ; 214.271352
```

DISCRETE_POLAR_RECEPTORS

Number of fields: 7

Field #	Description	Format	Optional?
1	Scenario Airport	Positive integer.	No
2	Receptor name	Text; up to 40 characters.	No
3	In the study?	T (for true) if this receptor should be in the active list. Otherwise F (for false) if this receptor should appear in the available list.	Yes (blank = "F", not in the study)
4	Source type	Text, must be one of the following strings: "Gate", "Parking Facility", "Roadway", "Runway",	No

		"Stationary Source", "Taxiway" or "Training Fire"	
5	Source name	Text; up to 40 characters. Must match a source name of a specified source exactly.	No
6	Direction (°)	Integer from 0 to 360	Yes (blank = 0)
7	Distance (m)	Number from 0 to 999999.999999	
8	Height (m)	Number 0 to 10 with 6 decimals allowed	

Example

!DISCRETE_POLAR_RECEPTORS

1 ; Polar Receptor ; T ; Gate ; Main ; 107 ; 1326.692504 ; 1.800000

USER-CREATED_AIRCRAFT

Number of fields: 41

Field #	Description	Format	Optional?
1	Aircraft name	Text; up to 40 characters.	No
2	Category	Text; up to 4 characters.	Yes (blank = "HCJP")
3	Air taxi?	Boolean - T/F.	Yes
4	European group category	Text; up to 2 characters.	Yes
5	Engine count	Integer from 1 to 8, inclusive.	Yes (blank = 1)
6	Use system emissions?	"T" = use system fuel flow and emission indices, "F" = user-edited fuel flow and/or emission indices.	Yes (blank = "F", user-edited fuel flow)
7	Emissions model aircraft code	Text; up to 15 characters.	Yes
8	Emissions model engine ICAO UID	Text; up to 10 characters.	Yes
9	Performance model aircraft code	Text; up to 15 characters.	Yes
10	Performance model engine ICAO UID	Text; up to 10 characters.	Yes
11	Bypass Ratio	Numeric value with 2 decimal places.	Yes
12	Default SOx (g/kg)	Numeric value with 6 decimal places.	Yes
13	Taxi out time (min)	Number from 0 to 120 with 2 decimals allowed	Yes (blank = 0)
14	Taxi out Fuel (kg/s)	Number from 0 to 10 with 6 decimals allowed	
15	Taxi out CO (g/kg)	Number from 0 to 2333 with 6 decimals allowed	
16	Taxi out HC (g/kg)	Number from 0 to 1000 with 6 decimals allowed	

Field #	Description	Format	Optional?
17	Taxi out NOx (g/kg)	Number from 0 to 1000 with 6 decimals allowed	
18	Taxi out PM (g/kg)	Number from 0 to 1000 with 6 decimals allowed	
19	Taxi out SN (SN)		
20	Takeoff time (min)	Number from 0 to 120 with 2 decimals allowed	Yes (blank = 0)
21	Takeoff fuel (kg/s)	Number from 0 to 10 with 6 decimals allowed	
22	Takeoff CO (g/kg)	Number from 0 to 2333 with 6 decimals allowed	
23	Takeoff HC (g/kg)	Number from 0 to 1000 with 6 decimals allowed	
24	Takeoff NOx (g/kg)	Number from 0 to 1000 with 6 decimals allowed	
25	Takeoff PM (g/kg)	Number from 0 to 1000 with 6 decimals allowed	
26	Takeoff SN (SN)		
27	Climb time (min)	Number from 0 to 120 with 2 decimals allowed	Yes (blank = 0)
28	Climb fuel (kg/s)	Number from 0 to 10 with 6 decimals allowed	
29	Climb CO (g/kg)	Number from 0 to 2333 with 6 decimals allowed	
30	Climb HC (g/kg)	Number from 0 to 1000 with 6 decimals allowed	
31	Climb NOx (g/kg)	Number from 0 to 1000 with 6 decimals allowed	
32	Climb PM (g/kg)	Number from 0 to 1000 with 6 decimals allowed	
33	Climb SN (SN)		
34	Approach time (min)	Number from 0 to 120 with 2 decimals allowed	Yes (blank = 0)
35	Approach fuel (kg/s)	Number from 0 to 10 with 6 decimals allowed	
36	Approach CO (g/kg)	Number from 0 to 2333 with 6 decimals allowed	
37	Approach HC (g/kg)	Number from 0 to 1000 with 6	

Field #	Description	Format	Optional?
		decimals allowed	
38	Approach NOx (g/kg)	Number from 0 to 1000 with 6 decimals allowed	
39	Approach PM (g/kg)	Number from 0 to 1000 with 6 decimals allowed	
40	Approach SN (SN)		
41	Taxi in time (min)	Numeric value with 2 decimal places.	Yes

Example

!USER-CREATED_AIRCRAFT

My Aircraft ; LCJP ; F ; JM ; 2 ; F ; A300F4-6 ; 1PW048 ; A109 ; 250B17 ;
4.60 ; 1.360000 ; 19.00 ; 0.211 ; 20.990000 ; 1.780000 ; 4.800000 ;
0.000000 ; 2.430 ; 0.70 ; 2.481 ; 0.400000 ; 0.090000 ; 30.200000 ;
0.000000 ; 8.100 ; 2.20 ; 2.004 ; 0.540000 ; 0.020000 ; 23.700000 ; ;
7.290 ; 4.00 ; 0.682 ; 1.880000 ; 0.140000 ; 11.800000 ; 0.000000 ; 2.430
; 7.00

USER-CREATED_GSE

Number of fields: 31

Field #	Description	Format	Optional?
1	Name	Text; up to 40 characters.	No
2	User GSE ID	Positive integer.	No
3	System GSE ID	Positive integer. Must match a system GSE ID.	Yes, if emissions factors are user-edited.
4	System type	Text; up to 30 characters.	Yes
5	Type year	A year from "1990" to "2020" inclusive.	Yes, if emissions factors are user-edited.
6	Default horsepower	Integer from 0 to 10000	Yes (blank = 0)
7	Default load factor	Number from 0 to 1 with 4 decimals	Yes (blank = 0)
8	Default operating time per LTO (minutes)	Number from 0 to 120 with 2 decimals allowed	Yes (blank = 0)
9	Operating time-departures (mins/LTO)	Number from 0 to 120 with 2 decimals allowed	Yes (blank = 0)
10	Operating time-annual (mins/LTO)	Integer from 0 to 8760	Yes (blank = 0)
11	Use system GSE?	"T" = use default system emission factors from specified system GSE, "F" = user-edited emissions factors	Yes (blank = "F", user-edited)
12	Diesel CO emission factor (g/hp/hr)	Number from 0 to 1000 with 6 decimals allowed	Yes (blank = 0)
13	Diesel HC emission factor (g/hp/hr)		
14	Diesel NOx emission factor (g/hp/hr)		

15	Diesel SOx emission factor (g/hp/hr)		
16	Diesel PM emission factor (g/hp/hr)		
17	Gas CO emission factor (g/hp/hr)		
18	Gas HC emission factor (g/hp/hr)		
19	Gas NOx emission factor (g/hp/hr)		
20	Gas SOx emission factor (g/hp/hr)		
21	Gas PM emission factor (g/hp/hr)		
22	CNG CO emission factor (g/hp/hr)		
23	CNG HC emission factor (g/hp/hr)		
24	CNG NOx emission factor (g/hp/hr)		
25	CNG SOx emission factor (g/hp/hr)		
26	CNG PM emission factor (g/hp/hr)		
27	LPG CO emission factor (g/hp/hr)		
28	LPG HC emission factor (g/hp/hr)		
29	LPG NOx emission factor (g/hp/hr)		
30	LPG SOx emission factor (g/hp/hr)		
31	LPG PM emission factor (g/hp/hr)		

Example

```
!USER-CREATED_GSE
Belt Loader ; 1006 ; 389 ; Belt Loader ; 2006 ; 0 ; 0.0000 ; 10.00 ; 1.00
; 0 ; F ; 2.597231 ; 0.525237 ; 5.467359 ; 0.901992 ; 0.503941 ;
241.064100 ; 10.025060 ; 7.243273 ; 0.175686 ; 0.062794 ; 33.361250 ;
37.196310 ; 12.176980 ; 0.013270 ; 0.056752 ; 33.361250 ; 2.536112 ;
12.176980 ; 0.013270 ; 0.056752
```

USER-CREATED_APUS

Number of fields: 11

Field #	Description	Format	Optional?
1	APU ID	Positive integer. Must be unique.	No
2	APU name	Text; up to 40 characters.	No

3	Default time - arrivals (min)	Number from 0 to 1000 with 2 decimals allowed	Yes (blank = 0)
4	Default time - departures (min)	Number from 0 to 1000 with 2 decimals allowed	Yes (blank = 0)
5	User emissions?	"F" = use default system emission factors from specified system GSE, "T" = user-edited emissions factors	Yes (blank = "F", user-edited)
6	CO (kg/hr)	Number from 0 to 1000 with 6 decimals allowed	Yes (blank = 0)
7	HC (kg/hr)		
8	NOx (kg/hr)		
9	SOx (kg/hr)		
10	PM (kg/hr)		
11	System APU ID	Positive integer. Must exactly match a system APU ID.	Yes, if emissions factors are user-edited.





Example

!USER-CREATED_APUS

101 ; My Apu ; 13.00 ; 13.00 ; F ; 0.564450 ; 0.042790 ; 0.115660 ; 4 ; 0 ; 0

Appendix C. GSE Reference Models

EDMS 5.0 includes ground support equipment (GSE) reference models that are representative of the equipment types in the EPA draft NONROAD model. The following table lists, for each GSE type, the available reference models and a picture of the equipment, if available. Users are not limited to selecting available GSE reference models, which are merely provided as a convenience. The user can override the horsepower and/or operating time of any GSE in a study to improve modeling fidelity.






GSE Name	Reference Model	Picture
Air Conditioner	ACE 802	<p>Series</p>  <p>Source: www.fsm-vienna.at</p>
Air Conditioner	ACE 804	<p>Series</p>  <p>Source: www.fsm-vienna.at</p>
Air Start	ACE 180	<i>Picture Not Available</i>
Air Start	ACE 300/400	<p>Series</p>  <p>Source: www.fsm-vienna.at</p>
Aircraft Tractor	Stewart & Stevenson TUG GT-35	 <p>Source: www.ssss.com</p>






GSE Name	Reference Model	Picture
Aircraft Tractor	Stewart & Stevenson TUG MC	 <p>Source: www.ssss.com</p>
Aircraft Tractor	Douglas TBL-180	 <p>Source: www.douglas-tugmaster.co.uk</p>
Aircraft Tractor	Douglas TBL-400	 <p>Source: www.douglas-tugmaster.co.uk</p>
Aircraft Tractor	Stewart & Stevenson TUG GT-50H	 <p>Source: www.ssss.com</p>
Aircraft Tractor	Stewart & Stevenson TUG T-750	 <p>Source: www.ssss.com</p>
Baggage Tractor	Stewart & Stevenson TUG MA 50	 <p>Source: www.ssss.com</p>


GSE Name	Reference Model	Picture
Belt Loader	Stewart & Stevenson TUG 660	 <p>Source: www.ssss.com</p>
Bobtail	Eagle Bobtail / F350	 <p>Source: www.eagleindustrialtruck.com</p>
Cabin Service Truck	Hi-Way / TUG 660 chasis	 <p>Source: www.tescohilift.com</p>
Cabin Service Truck	Hi-Way F650	 <p>Source: www.tescohilift.com</p>
Cargo Loader	FMC Commander 15	 <p>Source: www.fsm-vienna.at</p>
Cargo Loader	FMC Commander 30	 <p>Source: www.airport-technology.com</p>

GSE Name	Reference Model	Picture
Cargo Tractor	Stewart & Stevenson TUG MT	 <p>Source: www.ssss.com</p>
Cart	Taylor Dunn	 <p>Source: www.taylor-dunn.com</p>
Catering Truck	Hi-Way / TUG 660 chassis	 <p>Source: www.tescohilift.com</p>
Catering Truck	Hi-Way F650	 <p>Source: www.tescohilift.com</p>
Deicer	FMC LMD, Dual engines in GSE	 <p>Source: www.airport-technology.com</p>
Deicer	FMC Tempest II, Single engine in GSE	 <p>Source: www.fsm-vienna.at</p>

GSE Name	Reference Model	Picture
Fork Lift	Toyota 5,000 lb	 <p>Source: www.loadstarmhe.com</p>
Fuel Truck	F350	<i>No Picture Available.</i>
Fuel Truck	F750, Dukes Transportation Services, DART 3000 to 6000 gallon fuel truck	 <p>Source: www.dukestransportation.com</p>
Fuel Truck	Dukes Transportation Services / DART 8000 to 10,000 gallon fuel truck	 <p>Model R10000J-600</p> <p>Source: www.dukestransportation.com</p>
Generator	(None.)	 <p>Pictured: MD-3</p> <p>Source: www.victorygse.com</p>
Ground Power Unit	TLD	<p>Series</p>  <p>GPU-4000</p> <p>Source: www.tld-gse.com</p>

GSE Name	Reference Model	Picture
Ground Power Unit	TLD, 28 VDC	 <p>Source: www.tld-gse.com</p>
Ground Power Unit	TLD, 400 Hz AC	 <p>Source: www.tld-gse.com</p>
Hydrant Cart	Dukes Transportation Services THS-400	 <p>Source: www.dukestransportation.com</p>
Hydrant Truck	F250 / F350	No Picture Available.
Lavatory Truck	TLD 1410	 <p>Source: www.tld-gse.com</p>
Lavatory Truck	Wollard TLS-770 / F350	 <p>Source: www.gseservices-llc.com</p>

GSE Name	Reference Model	Picture
Lift	None.	 <p>Pictured: ML15-20 Source: www.tescohilift.com</p>
Passenger Stand	Wollard CMPS170 / CMPS228	 <p>Source: www.nmc-wollard.com</p>
Service Truck	F250 / F350	 <p>Source: www.contentedits.com</p>
Sweeper	Tennant	 <p>Source: www.tennantco.com</p>
Water Service	Wollard TWS-402 F250 / F350	 <p>Source: www.nmc-wollard.com</p>

GSE Name	Reference Model	Picture
Water Service	Gate Service	 <p>Pictured: FMC Jetway with JetFlo Source: www.jetwaysystems.com</p>

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